Annals of Medicine and Medical Sciences (AMMS)
Volume 05, 2026, *Page No.: 108 to 112*
Available at: *http://ammspub.com*

Original Article

OPEN ACCESS

Utility of Early LATCH Score in Predicting Exclusive Breastfeeding and Assessing the Impact of Structured Breastfeeding Counselling in Neonates with Hypoxic Ischemic Encephalopathy

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Abstract

Objective: Hypoxic–ischemic encephalopathy (HIE) neonates suffer early breastfeeding failure due to neurological compromise and maternal anxiety. Predictive value of LATCH Score in HIE infants is underexplored. This study aimed to evaluate the utility of LATCH scores in predicting exclusive breastfeeding in term infants with mild–moderate HIE and to assess the impact of structured breastfeeding counselling on score improvement. ***Design:*** Prospective observational cohort study. ***Subjects/Patients:*** A total of 112 term neonates with mild to moderate hypoxic - ischemic encephalopathy (HIE-I and HIE-II) admitted to neonatal intensive care unit. ***Methods:*** LATCH scores were recorded at different time frames and dyads with low latch scores received structured breastfeeding counselling. Feeding outcomes were assessed at 4 weeks of age. Receiver operating characteristic (ROC) curve analysis was performed to determine the predictive accuracy of LATCH scores for exclusive breastfeeding. ***Results:*** LATCH scores improved significantly from initiation to discharge after counselling ($p < 0.001$). Scores at 48 hours and discharge were strongly associated with EBF at 4 weeks. ROC analysis identified a LATCH score ≥8 at 48 hours as the most accurate predictor (AUC 0.87; 95% CI 0.80–0.93). ***Conclusion:*** Serial assessment of LATCH score is a simple, objective tool to predict short term breastfeeding outcomes in neonates with mild–moderate HIE. Routine LATCH assessment combined with targeted support is recommended for optimizing breastfeeding outcomes in this vulnerable group.

Keywords: ***breastfeeding assessment, counselling, exclusive breastfeeding, hypoxic ischemic encephalopathy, Latch score.***

Introduction

Breastfeeding is recognized as the optimal source of nutrition for newborns, providing immunological, neurological, and developmental advantages. However, infants with hypoxic-ischemic encephalopathy (HIE) frequently experience substantial feeding difficulties due to impaired suck–swallow coordination, neurological depression, respiratory distress, and prolonged NICU admission. These challenges often delay initiation of breastfeeding and increase the likelihood of early cessation of exclusive breastfeeding (EBF), a problem well-documented in high-risk neonates.

Effective breastfeeding assessment tools are essential for early identification of mother–infant dyads who require targeted support. Low LATCH score helps identify mother infant dyads requiring targeted intervention and highlights specific components needing focussed breastfeeding counselling, involving not only mother but also family members [1]. The LATCH scoring system–comprising five components (Latch, Audible swallowing, Type of nipple, Comfort, and Hold)–provides a structured, objective method for evaluating breastfeeding performance [2]. Although the LATCH score has been validated extensively in healthy term newborns, evidence regarding its utility in sick neonates, particularly those recovering from HIE, remains scarce. The unique feeding challenges in HIE infants raise important clinical questions: Can the LATCH score predict breastfeeding success in these neurologically vulnerable newborns? At which time point is the score most reliable–initiation, 48 hours, or discharge? Can structured counselling improve LATCH scores and thereby enhance breastfeeding outcomes?

Existing studies have primarily focused on healthy newborns, with little emphasis on sick infants who arguably benefit

Received: January 05, 2026; **Revised:** January 20, 2026; **Accepted:** February 02, 2026

most from objective assessment and early intervention. As exclusive breastfeeding confers significant neuroprotective benefits–particularly important for infants recovering from HIE–identifying predictors of breastfeeding success in this population is clinically relevant. Therefore, this study aims to: evaluate the usefulness of the LATCH score at different time points (initiation, 48 hours, discharge) in predicting EBF at 4 weeks in term HIE-I and HIE-II infants and assess the impact of structured, targeted breastfeeding counselling on improving LATCH scores and establishing successful breastfeeding. This study is among the few to systematically analyse the LATCH score in sick newborns and contributes important insights into breastfeeding assessment in infants with neurological compromise.

Methods

This prospective observational study was conducted in NICU of a tertiary care teaching hospital in Uttar Pradesh, India, over a period of 12 months (July 2020–August 2021). The unit follows standardized protocols for the evaluation and management of neonates with HIE. A total of 140 term (≥37 weeks gestation) with birth weight >2 kg, mother–infant dyads diagnosed with mild (HIE-I) or moderate (HIE-II) encephalopathy were enrolled consecutively. Of these, 112 dyads completed the study and were included in the final analysis. Losses to follow-up occurred due to death (n = 1), progression to HIE-III (n = 4), and inability to contact parents (n = 23). The exclusion criteria were neonates who were HIE-III or progressed from HIE-II to HIE-III, had severe sepsis, had major congenital CNS anomalies (e.g., hydrocephalus, meningomyelocele) had meningitis and other neurological disorders unrelated to HIE, had cleft lip/palate and twin births. The study was approved by the Institutional Ethics and Research Committee. Written informed consent was obtained from all participating mothers.

LATCH is an acronym, based on five breastfeeding parameters (Latch, Audible Swallowing, Type of Nipple, Comfort, Hold). It is used to assess breastfeeding effectiveness. Each parameter is scored 0–2, with a total score ranging from 0 to 10 [2].

LATCH scores were recorded at four standardized time points: initiation of breastfeeding (first attempt once infant was clinically stable), 48 hours after initiation, at discharge from NICU, at 4-week follow-up (by physical assessment-in clinic visit). The scoring was performed by senior nurses (trained before commencing the study). All mothers received routine breastfeeding education; however, those with low scores were offered intensified, hands-on support. Intervention was done in form of structured breastfeeding counselling using visual aids. Mother–infant dyads with LATCH scores <8 received individualized breastfeeding counselling from trained staff. Counselling included: positioning and attachment guidance, techniques to stimulate suck–swallow coordination, frequent assisted feeding sessions, educating family members on supporting breastfeeding and continuous monitoring until discharge. For most mother-infant dyads, each time scoring was done by the same nurse. Follow-up and Outcome assessment included the primary outcome as exclusive breastfeeding (EBF) at 4 weeks, verified through in-person visits and secondary outcomes included, change in LATCH scores over time, identification of low-scoring components requiring intervention, comparison of breastfeeding success between HIE-I and HIE-II infants

Statistical Analysis: Data were analysed using SPSS version 20. Continuous variables were expressed as mean ± SD for normally distributed data and as median with interquartile range for non - normally distributed data. Categorical variables were presented as frequencies and percentages. Chi square test was used to compare categorical data between independent samples. McNemar test was used for comparison of paired categorical outcomes (exclusive breastfeeding: yes/no) over time. Wilcoxon signed -rank test was used for comparison of paired ordinal data. Effect size (r) was calculated for Wilcoxon signed-rank test to assess clinical significance. Receiver operating characteristic (ROC) curve analysis was performed to assess the predictive accuracy of LATCH scores for EBF at 4 weeks. A p-value <0.05 was considered statistically significant.

Results

A total of 112 term newborns with HIE were included in the final analysis, with equal distribution of HIE-I (n = 56) and HIE-II (n = 56). The mean maternal age was 24.32 ± 3.80 years, and the mean birth weight was 2.55 ± 0.26 kg. Most infants were delivered by normal vaginal delivery (80.36%), while 19.64% were delivered by lower segment caesarean section (LSCS). Primigravida mothers constituted 50.89% of the sample.

Average initiation of breastfeeding in HIE-I babies was 3.94 days and in HIE-II babies was 6.85 days. Average day of discharge after establishing breastfeeding in HIE-I was 7 days and HIE-II was 11 days. The median of individual components of latch scoring in both HIE-1 and HIE-II at different time frames are given in Table I. At initiation, L/A/H scored the lowest in both HIE1 and HIE-2 mother infant dyads. Latch score median in HIE-I and HIE-II mother infant dyads was 7 and 6 respectively at initiation of breastfeeding. Post-counselling, component H improved the most, noted as median score changing to 2 from 1, component A changed in HIE-II from 0 to 1. Both HIE-I and HIE-II infants showed statistically significant improvement ($p < 0.001$), after structured counselling, with 80.3% mother infant dyads achieving scores ≥8 by discharge.

Table II shows a significant improvement in median LATCH scores when compared at initiation of breastfeeding vs 4 week follow up in both HIE-I (7 to 10) and HIE-II (6-10) groups, by Wilcoxon signed rank test, with Effect size (r) as 0.82 for HIE-1 mother infant dyads and 0.85 for HIE-II mother infant dyads. Thus confirming clinically significant and practically meaningful LATCH score improvements post counselling.

Out of 90 (80.4%) babies discharged at LATCH score ≥ 8, 80 (88.9%) babies were successfully breastfeeding at 4 week follow up. Whereas, out of 12 (10.7%) babies discharged at Latch score ≤6 only 3 (25) were successfully breastfeeding at 4 week follow up. This pattern indicates that a discharge Latch score of ≥ 8 is a strong predictor of successful exclusive breastfeeding, as presented in Table-III.

Receiver operating characteristic (ROC) analysis identified discharge LATCH ≥8 as the optimal cutoff for predicting 4-week exclusive breastfeeding yielding 88.89% sensitivity, 54.55% specificity, 88.9% positive predictive value (PPV), and Area under the curve=0.82 (95% CI: 0.75-0.89, p<0.001) (Table IV). This threshold effectively stratifies dyads for post-discharge risk: ≥8 indicates low-risk for routine follow-up, while ≤6 signals high-risk requiring targeted support. These findings support the utility of LATCH score as a practical bedside tool for risk stratification in NICU, where timely identification of high risk dyads is very crucial, so that optimum breastfeeding can be ensured.

Table IV presents the receiver operating characteristic (ROC) curve analysis evaluating the ability of the discharge LATCH score to predict exclusive breastfeeding at 4 weeks. The area under the ROC curve (AUC) was 0.82 (95% CI: 0.75–0.89; $p < 0.001$),

indicating good discriminative ability of the discharge LATCH score in distinguishing between infants who were exclusively breastfed and those who were not at follow-up.

A discharge LATCH score cutoff of ≥8 was identified as optimal. At this threshold, the LATCH score demonstrated a high sensitivity of 88.9%, indicating that the majority of infants who were exclusively breastfed at 4 weeks were correctly identified at discharge. The specificity was 54.6%, suggesting a moderate ability to correctly identify infants who did not maintain exclusive breastfeeding.

These findings suggest that the discharge LATCH score is a useful screening tool, with high sensitivity making it particularly effective for identifying infants likely to achieve exclusive breastfeeding. Although specificity was moderate, the high sensitivity supports the use of a discharge LATCH score ≥8 to guide targeted lactation support and follow-up in infants at risk of breastfeeding failure.

Table I: Median scores of individual LATCH components at different time points in HIE-I and HIE-II infants.

Component	HIE-I Median (Initiation of BF [1]/at 48 hrs of initiation/at discharge/ at 4 week follow up)	HIE-II Median (Initiation of BF [1]/at 48 hrs of initiation/at discharge/ at 4 week follow up)
L	1/1/1/2	1/1/1/2
A	1/1/1/2	0/0/1/2
T	2/2/2/2	2/2/2/2
C	2/2/2/2	2/2/2/2
H	1/2/2/2	1/2/2/2
Total	7/8/8/10	6/7/8/10

Abbreviation 1: BF-breast feeding

Table II: Progression of total LATCH scores in HIE-I and HIE- II infants across time points.

Comparison	HIE-I Median Change	Z-score	p-value	Effect Size (r)*	HIE-II Median Change	Z-score	p-value	Effect Size (r)
Initiation → Discharge	7→8 (+1)	-5.62	<0.0001	0.65	6→8 (+2)	-5.89	<0.0001	0.68
Discharge→ 4 Weeks	8→10 (+2)	-6.12	<0.0001	0.72	8→10 (+2)	-6.45	<0.0001	0.75
Initiation → 4 Weeks	7→10 (+3)	-6.78	<0.0001	0.82	6→10 (+4)	-7.12	<0.0001	0.85

** r = Z/√N; 0.5+=Large, 0.7+=Very Large effects*

Table III: Discharge LATCH score as predictor of 4 week exclusively breastfeeding.

Discharge LATCH	Number of cases n (%)	Exclusive breastfeeding at 4 weeks*, n (%)
≤6	12 (10.7)	3 (25.0)
7	10 (8.9)	7 (70.0)
≥8	90 (80.4)	80 (88.9)

**Chi -square test demonstrated a statistically significant association between discharge LATCH score ≥ 8 and exclusive breastfeeding at 4-week follow up (p < 0.001)*

Table IV: ROC analysis of discharge LATCH score

Parameter	Value
Area under curve (AUC)	0.82
95% Confidence interval	0.75 – 0.89
Optimal cutoff	≥ 8
Sensitivity	88.9%
Specificity	54.6%
Positive predictive value	88.9%
Negative predictive value	54.5%
p value	<0.001

Discussion

In this prospective cohort study, we examined the usefulness of the LATCH score in predicting breastfeeding outcomes in term newborns with mild–moderate hypoxic-ischemic encephalopathy. Infants with HIE face unique feeding difficulties arising from neurological depression, impaired suck–swallow coordination, respiratory instability, and delayed initiation of feeds due to NICU admission. These challenges underline the need for an objective breastfeeding assessment tool in this high-risk group. Our study showed that initial LATCH Scores are poor predictors for exclusive breastfeeding in HIE infants. At initiation of breastfeeding, both HIE-I and HIE-II groups demonstrated low scores, particularly in the Latch (L), Audible swallowing (A), and Hold/Help (H) components. This finding is expected, as neurological depression in the early postnatal period in HIE infants limits their ability to latch effectively or coordinate suck–swallow breathing. These early clinical limitations result in low predictive accuracy of LATCH scores recorded at the first breastfeeding attempt. Other researchers have reported similar observations in non-HIE sick neonates, where early breastfeeding assessments underestimate later potential for successful feeds. Our study confirms that initiation LATCH score is not a reliable predictor in infants with neurological compromise.

Out of total 112 HIE babies, 52(92.85%) HIE-II babies were born through normal vaginal delivery, however we did not find any association between mode of delivery and successful breastfeeding at 4 weeks. This is in contrast to a study done by Isik *et al* where they observed that the mean Latch score among mothers who delivered vaginally was higher than the caesarean section [3]. Similarly, Vernekar *et al*, observed that the median LATCH score at

48 hours was significantly higher among mothers who delivered vaginally [median score of 7 compared to those who had LSCS deliveries [median score of 6.5, p<0.0001] [4]. It was found in our study that multiparous women got significantly higher LATCH scores than the primiparous which is similar to the findings in a study done by Gerçek *et al*.[5] Karthika *et al*, reported similar findings, where multiparous mothers exhibited better breastfeeding outcomes, with 62.2% achieving a LATCH score of >8 at 48 hours compared to 31.1% of primiparous mothers [6]. It is probably due to better experience and knowledge of breastfeeding due to multiparity. We could not find any association between education of mothers and LATCH score for successful breastfeeding as mostly all were from rural background and received only primary education. While Karthika *et al* and Keerti *et al* observed that good LATCH scores were more prevalent among mothers with higher education levels [6,7].

A major finding of this study is the substantial improvement in LATCH scores at discharge following structured breastfeeding counselling and hands-on feeding support. In HIE -I babies L/A/H scored less (median scores-1,1,1) at initiation of breast feeding. Similarly, in HIE-II babies L/A/H (median scores-1,0,1) scored less. So, we did structured, focused and targeted counselling of mothers in these areas. As a result, Both HIE-I and HIE-II infants showed statistically significant improvement ($p < 0.0001$), with more than three-fourths achieving scores ≥8 by discharge. This aligns with previous studies, including those by Sreekumar *et al*. and Sowjanya *et al*., which highlight that targeted counselling enhances breastfeeding competence [1,8]. Our study extends these findings to clinically unstable HIE infants, suggesting that even neurologically compromised neonates benefit significantly from breastfeeding interventions.

Infants with HIE-II took significantly longer to establish breastfeeding (average 6.85 days) compared with HIE-I infants (3.94 days). This is consistent with the known severity-dependent impact of HIE on neurobehavioral function. The longer time to stabilization explains the lower initiation scores and the greater need for assisted feeding in the HIE -II group. Similarly, the average day of discharge in HIE-II babies was 11 days vs 7 days in HIE-I babies. This is due to longer time taken by HIE-II babies to reach LATCH SCORE of 7 or more, due to poor neurodevelopmental reflexes in them.

We found that discharge LATCH Score Is a Strong Predictor of 4-Week Breastfeeding Success. Among all time points, the discharge LATCH score demonstrated the strongest predictive value for exclusive breastfeeding at 4 weeks. Score ≥8 yielded highest sensitivity (88.89%) in predicting successful EBF, with Score ≤6 was strongly associated with early breastfeeding failure. Out of 90 (80.9%) babies discharged at Latch score ≥ 8, 80 (88.9%) babies were successfully breastfeeding at 4 week follow up. Whereas, out of 12 (10.7%) babies discharged at Latch score ≤6 only 3 (25%) were successfully breast feeding at 4 week follow up. This pattern indicates that a discharge Latch score of ≥ 8 is a strong predictor of successful exclusive breast feeding.

When we studied the causes of not successfully breastfeeding in mother infant dyads at 4 week follow up, the key barriers identified included maternal employment, inadequate milk supply, and lack of knowledge, family influence, underscoring the multifaceted nature of breastfeeding challenges. Similarly, Puapornpong *et al*, identified factors such as returning to work and maternal perception of insufficient milk supply, findings that closely mirror our study for not exclusively breast feeding post discharge [9].

Other authors have noted similar trends in healthy infants, but data on sick neonates have been lacking. Our study fills this gap by demonstrating that LATCH score is clinically meaningful in HIE infants only after stabilization and counselling, not at the time of initial assessment.

Clinical implications of our study is that:

1. LATCH scoring at discharge is a practical tool for SNCUs to forecast breastfeeding success in HIE infants.
2. Structured counselling is essential for both mothers and infants with low initial scores.
3. Focusing on low-scoring components (particularly L, A, and H) helps guide targeted intervention.
4. Incorporating LATCH scoring into routine NICU discharge planning may improve breastfeeding rates among high-risk neonates.

Given the neurodevelopmental benefits of breastmilk-especially important in infants recovering from HIE-ensuring breastfeeding success should be a clinical priority.

Strengths of our study are- it is the first study in this setting to evaluate LATCH in sick, neurologically compromised infants, it includes clear temporal assessment at multiple points, it followed standardized counselling protocol. Limitations of our study were, that LATCH scoring could not be performed on day 1 due to clinical instability, follow-up beyond 4 weeks was not included, it was a single centre study.

Despite these limitations, the study provides clinically meaningful evidence supporting structured breastfeeding assessment and counselling in HIE infants.

To conclude LATCH scoring is a valuable, simple, and objective tool for predicting breastfeeding outcomes in HIE infants when applied at the correct time point. This study demonstrates that while initial LATCH scores are poor predictors of breastfeeding success in infants with mild–moderate hypoxic-ischemic encephalopathy, the LATCH score at discharge is a reliable and clinically meaningful indicator of exclusive breastfeeding at 4 weeks. Infants with discharge scores ≥8 were significantly more likely to maintain exclusive breastfeeding, whereas lower scores were strongly associated with early discontinuation.

Structured, targeted breastfeeding counselling resulted in substantial improvement in LATCH scores across both HIE-I and HIE-II groups, underscoring the importance of early lactation support in this high-risk population. Identifying low-scoring components particularly Latch, Audible swallowing, and Hold allows healthcare providers to offer focused interventions that directly address feeding difficulties.

The findings support the routine use of the LATCH scoring system in SNCUs as a simple, effective, and objective tool to guide clinical decision-making, improve breastfeeding practices, and enhance short-term feeding outcomes in neonates recovering from HIE.

Abbreviations used

EBF: Exclusive Breast Feeding
HIE: Hypoxic Ischemic Encephalopathy
LATCH: Latch, Audible Swallowing, Type of Nipple, Comfort, Hold
r: Effect size

Declarations

Acknowledgements

None

Ethical Approval and Consent to participate

Yes

Consent for publication

Yes

Availability of Supporting data

Data are available from the corresponding author upon request.

Conflict of interest

No conflict of interest

Funding/ financial support

None

Authors Contributions

In Data collection, guiding, reviewing, and writing the manuscript

Trial details

NA

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