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ORIGINAL ARTICLE

Comparison between Epidural and Programmed Analgesia on Pain Relief during Labour in 70 Parturients

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Taufique Hasan[1], Sushain Chandro Ray[2], Moffizur Rahman Chowdhury[3], Monira Begum[4]

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Correspondence to
Taufique Hasan

ORCID
https://orcid.org/0009-0000-5133-3209

ABSTRACT

Background: *Labour pain is one of the most severe forms of physiological pain, and effective analgesia significantly improves maternal satisfaction and obstetric outcomes. Epidural labour analgesia (ELA) is the gold standard; however, programmed labour analgesia (PLA) a multimodal regimen integrating pharmacological and non-pharmacological elements has gained popularity for its simplicity, accessibility, and reduced intervention rates.* ***Objective:*** *To compare the effectiveness, safety, and maternal satisfaction of Epidural Labour Analgesia (ELA) versus Programmed Labour Analgesia (PLA) in controlling labour pain among parturients.* ***Methods & Materials:*** *This comparative observational study included 70 term parturients divided into two groups: ELA (n=35) and PLA (n=35). Pain scores were measured using a Visual Analog Scale (VAS) at baseline, 30 min, 1 hour, and full dilation. Secondary outcomes included duration of labour, mode of delivery, maternal side effects, neonatal APGAR scores, and overall maternal satisfaction.* ***Results:*** *Both methods significantly reduced labour pain ($p < 0.001$). ELA achieved superior pain relief at all assessed intervals, with mean VAS at full dilation of 2.4 ± 1.1 compared to PLA's 4.8 ± 1.5. The duration of the first and second stages of labour was slightly longer in the ELA group, though not statistically significant. Instrumental delivery was more frequent in ELA (14.3%) than PLA (5.7%). Maternal side effects such as hypotension and pruritus were higher in ELA. Neonatal outcomes were comparable. Maternal satisfaction was significantly higher in ELA ($p < 0.05$).* ***Conclusion:*** *Epidural labour analgesia provides superior pain control and greater maternal satisfaction, although it is associated with a slightly longer labour duration and higher rate of instrumental delivery. Programmed labour analgesia remains a safe, effective, and resource-friendly alternative in settings where epidural services are limited.*

Keywords: *Epidural analgesia, Programmed labour analgesia, Labour pain, Obstetric analgesia, Maternal satisfaction.*

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1. *Junior Consultant, Department of Anaesthesia, Analgesia and ICU, Dinajpur Medical College Hospital, Dinajpur, Bangladesh*
2. *Senior Consultant, Department of Anaesthesiology, Dinajpur Medical College Hospital, Dinajpur, Bangladesh*
3. *Assistant professor, Department of Anaesthesiology, Dinajpur Medical College Hospital, Dinajpur, Bangladesh*
4. *Junior Consultant, Department of Anaesthesiology, Dinajpur Medical College Hospital, Dinajpur, Bangladesh*

INTRODUCTION

Labour pain is among the most intense forms of physiological pain experienced by women and represents a major contributor to maternal anxiety and stress during childbirth. Effective labour analgesia enhances maternal wellbeing, optimizes uterine–placental perfusion, reduces stress-related hormonal surges, and improves obstetric outcomes. Over the past decades, advancements in labour analgesia have broadened options for parturients, ranging from systemic opioids to neuraxial techniques. Epidural labour analgesia (ELA) remains the gold standard for pain relief during labour because it provides predictable sensory blockade with minimal fetal drug transfer. Multiple studies have established its superiority in achieving effective, titratable analgesia while maintaining maternal consciousness and active participation in childbirth.[1–3] However, ELA requires specialized equipment, continuous monitoring, and expertise from trained anesthesiologists, limiting its availability in many low-resource facilities. Programmed labour analgesia (PLA), also known as "labour analgesia without epidural," offers a practical, multimodal approach integrating pharmacologic components (e.g., paracetamol, NSAIDs, opioids, antispasmodics) and non-pharmacologic techniques (breathing exercises, position changes, hydration). PLA is widely used in South Asian maternity units where epidural services may not be consistently available. Although PLA provides moderate pain relief, its effectiveness compared with ELA is still being investigated. Despite several clinical trials exploring both approaches, direct comparative data in many regions, including Bangladesh and similar resource-constrained settings, remain limited. Additionally, maternal satisfaction—a crucial indicator increasingly emphasized in obstetric care—is variably reported. This study was designed to compare ELA and PLA in controlling labour pain, with attention to maternal outcomes, obstetric variables, neonatal safety, and overall satisfaction. By evaluating 70 cases, this research provides practical insights relevant to both tertiary hospitals and secondary care centres where flexibility in analgesia provision is essential.

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MATERIALS & METHODS

This comparative observational study was conducted in the Department of Anaesthesia, Analgesia and ICU, Dinajpur Medical College Hospital, Dinajpur, Bangladesh from January 2024 to July 2024 over a 7-month period. A total of 70 term parturients who requested labour analgesia during the active phase of labour were enrolled. Participants were divided into two equal groups based on the type of analgesia provided: **Group A**, consisting of 35 women who received Epidural Labour Analgesia (ELA), and **Group B**, comprising 35 women who received Programmed Labour Analgesia (PLA). The allocation followed a consecutive sampling approach, ensuring that all eligible women who opted for either analgesia modality were included.

Eligibility Criteria

Women were eligible for inclusion if they were:

- at term pregnancy (37–41 weeks),
- carrying a singleton fetus in cephalic presentation,
- in the active phase of labour with cervical dilation between 3–5 cm, and
- willing to provide informed consent for participation.

Women with contraindications to neuraxial analgesia (such as coagulopathy, thrombocytopenia, spinal deformities, or infection at the puncture site), allergy to the study drugs, high-risk pregnancies requiring urgent intervention, or non-reassuring fetal heart patterns at recruitment were excluded.

Analgesia Techniques

Group A: Epidural Labour Analgesia (ELA)

Epidural catheterization was performed at the L3–L4 or L4–L5 interspace under strict aseptic precautions. A test dose of lignocaine 1.5% with adrenaline was administered to exclude intrathecal or intravascular placement. Analgesia was maintained using a continuous infusion of 0.1% bupivacaine combined with fentanyl (2 mcg/mL). Additional bolus doses were provided when necessary. Maternal vitals, pain scores, and fetal heart rate were monitored continuously.

Group B: Programmed Labour Analgesia (PLA)

The PLA regimen consisted of a structured combination of systemic analgesics, antispasmodics, and supportive measures. Women received intravenous tramadol 50 mg every 6 hours, intravenous paracetamol 1 g every 8 hours, and intravenous hyoscine butylbromide 20 mg for cervical relaxation. Non-pharmacological methods—such as breathing exercises, frequent maternal repositioning, hydration, and one-to-one emotional support—were incorporated according to standardized departmental protocols.

Outcome Measures

The primary outcome was pain intensity, assessed using the Visual Analog Scale (VAS) at baseline, 30 minutes, 1 hour, and at full cervical dilation. Secondary outcomes included duration of the first and second stages of labour, mode of delivery, maternal side effects (hypotension, pruritus, urinary retention, nausea/vomiting), neonatal outcomes (APGAR scores at 1 and 5 minutes, NICU admission), and overall maternal satisfaction evaluated using a 5-point Likert scale.

Data Handling and Statistical Analysis

All data were recorded in structured proformas and analyzed using SPSS version 26. Continuous variables were expressed as mean ± standard deviation and compared using independent t-tests, while categorical variables were analyzed using chi-square or Fisher's exact tests. A p-value < 0.05 was considered statistically significant.

RESULTS

A total of 70 parturients were included in the study, with 35 women receiving epidural labour analgesia (ELA) and 35 receiving programmed labour analgesia (PLA). The baseline demographic and obstetric characteristics of the two groups were comparable. The mean maternal age was 25.8 ± 4.2 years in the ELA group and 26.1 ± 4.5 years in the PLA group, with no statistically significant difference between them. The proportions of primigravida women were similar (54.3% in ELA vs. 51.4% in PLA), and the mean gestational age at term was nearly identical (38.6 ± 1.1 weeks vs. 38.7 ± 1.2 weeks). Cervical dilation at the time of analgesia administration was also comparable, averaging 3.8 ± 0.9 cm in the ELA group and 4.0 ± 0.8 cm in the PLA group. No variable showed a significant difference, confirming adequate baseline comparability.

Pain intensity, assessed using the Visual Analog Scale (VAS), showed significant differences between the two groups after analgesia administration. Before analgesia, both groups reported similarly high pain scores (8.4 ± 0.9 in the ELA group and 8.3 ± 1.0 in the PLA group). However, at 30 minutes following analgesia, women receiving ELA exhibited a marked reduction in pain, with VAS scores falling to 3.2 ± 1.2, compared to 6.1 ± 1.4 in the PLA group ($p < 0.001$). This trend continued at 1 hour, where ELA participants recorded a mean VAS of 2.6 ± 1.3 versus 5.5 ± 1.3 in the PLA group ($p < 0.001$). At full cervical dilation, the difference remained significant, with mean VAS scores of 2.4 ± 1.1 in the ELA group compared to 4.8 ± 1.5 among PLA recipients ($p < 0.001$). These findings demonstrate that epidural analgesia produced consistently superior pain relief across all measured intervals.

Labour progress indicators showed a modest but non-significant prolongation of labour duration in the ELA group. The mean duration of the first stage was 7.9 ± 1.8 hours in the ELA group compared to 7.2 ± 1.5 hours in the PLA group, while the second stage lasted 48 ± 14 minutes versus 42 ± 12 minutes, respectively. Although both stages tended to be longer with epidural analgesia, these differences did not reach statistical significance. Regarding delivery mode, normal vaginal delivery occurred in 71.4% of women in the ELA group and 80% in the PLA group. Instrumental delivery was more frequent among ELA recipients (14.3%) compared to PLA (5.7%), whereas the caesarean section rate was identical in both groups (14.3%). None of these differences were statistically significant.

Maternal side effects varied between the groups. Hypotension occurred more commonly in the ELA group, affecting 17.1% of women compared to only 2.8% in the PLA group, a statistically significant difference ($p = 0.04$). Pruritus was also significantly more common among ELA recipients (11.4%), while it was absent in the PLA group ($p = 0.04$). Urinary retention was noted in 14.3% of women in the ELA group but not observed in any PLA participant ($p = 0.02$). Incidence of nausea and vomiting did not differ significantly between groups, occurring in 8.6% of ELA patients and 14.3% of PLA patients.

Neonatal outcomes were similar across both analgesia methods. The mean APGAR score at 1 minute was 7.9 ± 0.4 in the ELA group and 7.8 ± 0.5 in the PLA group, while the 5-

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minute APGAR averaged 9.0 ± 0.3 versus 8.9 ± 0.4, respectively. These differences were not statistically significant. NICU admission rates were low and comparable, with 2.8% in the ELA group and 5.7% in the PLA group.

Maternal satisfaction scores differed significantly between the groups. Women who received ELA reported a higher mean satisfaction rating of 4.6 ± 0.4 on a 5-point Likert scale, compared to 3.8 ± 0.7 among PLA recipients ($p < 0.001$). This reflects the superior analgesic effectiveness and overall childbirth experience associated with epidural techniques.

Table – I: Baseline Characteristics

Variable	ELA (n=35)	PLA (n=35)	p-value
Maternal age (years)	25.8 ± 4.2	26.1 ± 4.5	0.78
Parity (primigravida %)	54.3%	51.4%	0.81
Gestational age (weeks)	38.6 ± 1.1	38.7 ± 1.2	0.64
Cervical dilation at entry (cm)	3.8 ± 0.9	4.0 ± 0.8	0.42

No significant differences were noted between groups.

Table – II: Pain Scores (VAS)

Time Point	ELA	PLA	p-value
Baseline	8.4 ± 0.9	8.3 ± 1.0	0.77
30 min	3.2 ± 1.2	6.1 ± 1.4	<0.001
1 hour	2.6 ± 1.3	5.5 ± 1.3	<0.001
Full dilation	2.4 ± 1.1	4.8 ± 1.5	<0.001

Epidural analgesia provided significantly better pain relief at all intervals.

Table – III: Labour Progress and Delivery Outcomes

Variable	ELA	PLA	p-value
Duration of 1st stage (hours)	7.9 ± 1.8	7.2 ± 1.5	0.09
Duration of 2nd stage (minutes)	48 ± 14	42 ± 12	0.08
Normal vaginal delivery (%)	71.4%	80%	0.39
Instrumental delivery (%)	14.3%	5.7%	0.19
Cesarean section (%)	14.3%	14.3%	1.00

Though not statistically significant, ELA showed slightly prolonged labour and more assisted deliveries.

Table – IV: Maternal Side Effects

Side Effect	ELA	PLA	p-value
Hypotension	17.1%	2.8%	0.04
Pruritus	11.4%	0%	0.04
Nausea/Vomiting	8.6%	14.3%	0.46
Urinary retention	14.3%	0%	0.02

Epidural analgesia had more procedure-related side effects.

Table – V: Neonatal Outcomes

Variable	ELA	PLA	p-value
APGAR 1 min	7.9 ± 0.4	7.8 ± 0.5	0.52
APGAR 5 min	9.0 ± 0.3	8.9 ± 0.4	0.37
NICU admission (%)	2.8%	5.7%	0.55

Neonatal outcomes were comparable.

Table – VI: Maternal Satisfaction

Satisfaction Score	ELA	PLA	p-value
Mean score (1–5)	4.6 ± 0.4	3.8 ± 0.7	<0.001

DISCUSSION

This comparative study assessed the effectiveness of epidural labour analgesia (ELA) and programmed labour analgesia (PLA) in reducing labour pain among 70 parturients. The findings indicate that ELA provides superior analgesic efficacy, greater maternal satisfaction, and stable neonatal outcomes, consistent with international literature supporting epidural as the gold standard.[4–6] Pain reduction, assessed through VAS, demonstrated significantly lower scores in the ELA group at all time intervals. Such profound analgesic effect aligns with findings from Anim-Somuah et al.[7], who reported significant pain reduction with neuraxial techniques compared to systemic analgesia. The first and second stages of labour were slightly prolonged in the ELA group. This is a known physiological consequence of neuraxial blockade due to reduced pelvic muscle tone and diminished reflex bearing-down efforts. However, the differences in our study did not reach statistical significance, implying clinical acceptability. Previous meta-analyses have suggested similar results, showing minimal prolongation without adverse maternal outcomes.[8] Instrumental delivery was more common with ELA (14.3% vs 5.7%). Although the difference was statistically nonsignificant, it reflects a trend commonly reported in classical literature, likely due to reduced expulsive force or

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obstetrician preference. Modern low-dose epidural regimens, similar to ours, have been shown to mitigate this effect.[9] Side-effect profiles in ELA included hypotension, pruritus, and urinary retention, consistent with pharmacological mechanisms of epidural local anesthetics and opioids. PLA demonstrated fewer physiological side effects, reflecting its non-neuraxial nature and lower systemic drug intensity. Neonatal outcomes—including APGAR scores and NICU admissions—were comparable between groups, supporting the safety of both methods. This finding aligns with global evidence that neuraxial analgesia does not adversely affect neonatal well-being.[10] Maternal satisfaction was significantly higher in the ELA group. Adequate pain control has been shown to reduce maternal stress, improve psychological experience, and enhance overall birth satisfaction.[11] PLA, while effective to a moderate degree, may not match the profound analgesia offered by epidurals, contributing to lower satisfaction scores. From a practical standpoint, PLA remains valuable in low-resource settings where anesthetic expertise or equipment for neuraxial analgesia may not be available 24/7. It offers a structured, safe, and scalable approach for improving maternal comfort. However, whenever resources permit, ELA should be considered the preferred modality.

CONCLUSION

Epidural labour analgesia provides significantly superior pain relief and maternal satisfaction compared with programmed labour analgesia, without compromising neonatal outcomes. Although associated with slightly increased side effects and a trend toward prolonged labour and instrumental delivery, these differences were not clinically prohibitive. Programmed labour analgesia remains a safe and practical alternative, particularly in resource-limited settings.

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