Scholars Journal of Applied Medical Sciences
Abbreviated Key Title: Sch J App Med Sci
ISSN 2347-954X (Print) | ISSN 2320-6691 (Online)
Journal homepage: https://saspublishers.com

OPEN ACCESS

Anaesthesia

Compare Efficacy Epidural Analgesia and Programmed Labour Analgesia in Controlling Labour Pain

Dr Rayhan Mahmud[1*], Dr. Tasnim Ara Islam[2], Dr. Atiqur Rahman[3], Dr. Avik Das Chowdhury[4], Dr. Jayanta Das[5]

[1]Assistant Professor (cc), Department of Anaesthesia and ICU, Parkview Medical College and Hospital, Sylhet, Bangladesh
[2]Senior Medical Officer, Department of Medicine, Al Haramain Hospital PVT LTD, Sylhet, Bangladesh
[3]Assistant Professor, Department of Anaesthesia and ICU, Parkview Medical College, Sylhet, Bangladesh
[4]Medical Officer, 250 Bed District Sadar Hospital Sunamganj, Bangladesh
[5]Registrar, Department of Surgery, Parkview Medical College Hospital, Sylhet, Bangladesh

DOI: https://doi.org/10.36347/sjams.2026.v14i04.003 | **Received:** 25.02.2026 | **Accepted:** 01.04.2026 | **Published:** 06.04.2026

***Corresponding author:** Dr Rayhan Mahmud
Assistant Professor (cc), Department of Anaesthesia and ICU, Parkview Medical College and Hospital, Sylhet, Bangladesh

Abstract **Original Research Article**

Background: Labour pain is one of the most intense forms of pain experienced by women, involving both physiological and psychological components. Effective pain management improves maternal comfort, labour experience, and potentially labour outcomes. Epidural analgesia is considered the gold standard for labour pain relief, while programmed labour analgesia offers a structured, resource-friendly alternative. ***Objective:*** To compare the efficacy, safety, labour outcomes, and cost of epidural analgesia versus programmed labour analgesia in women undergoing labour. ***Methods:*** This prospective comparative study was conducted in a tertiary hospital from July 2024 to July 2025. A total of 200 pregnant women in active labour were enrolled and equally divided into two groups: Group A received epidural analgesia and Group B received programmed labour analgesia. Maternal vital signs, fetal heart rate, labour progress, and pain scores (VAS) were monitored. Primary outcomes included pain relief, duration of labour stages, mode of delivery, and maternal satisfaction. Secondary outcomes included APGAR scores, fetal heart rate variations, instrumental delivery, maternal complications, and analgesia cost. Data were analyzed using SPSS v23.0, with $p<0.05$ considered significant. ***Results:*** Baseline characteristics were comparable between groups. Epidural analgesia provided superior pain relief, with mean VAS scores decreasing from 8.3 ± 1.0 to 3.0 ± 1.1, compared to 8.5 ± 1.0 to 4.6 ± 1.3 in programmed labour analgesia ($p<0.001$). The first stage of labour was longer in Group A (302 ± 45 min) than Group B (255 ± 40 min, $p<0.001$), while second-stage duration and mode of delivery were comparable. Maternal complications, including hypotension, motor blockade, and nausea, were slightly higher in the epidural group, with motor blockade being statistically significant ($p=0.038$). APGAR scores at 1 and 5 minutes were similar between groups. The mean cost of analgesia was substantially higher in Group A ($12,800 \pm 1,300$ BDT) compared to Group B ($4,400 \pm 500$ BDT). ***Conclusion:*** Epidural analgesia provides more effective and consistent pain relief during labour but is associated with a longer first stage, slightly higher maternal complications, and greater cost. Programmed labour analgesia offers moderate pain control, shorter first-stage labour, fewer complications, and is more cost-effective. Both methods are generally safe for mother and neonate, allowing analgesia choice to be tailored based on clinical resources, maternal preference, and cost considerations.

Keywords: Labour pain, Epidural analgesia, Programmed labour analgesia, Pain management.

INTRODUCTION

Labour pain is widely recognized as one of the most intense forms of pain experienced by women, encompassing both physiological and psychological components. It arises from uterine contractions, cervical dilation, and the stretching of the birth canal, often accompanied by fear, anxiety, and emotional stress. Effective management of labour pain is an essential aspect of obstetric care, as it not only improves maternal comfort but also contributes to a more positive childbirth experience and may influence labour outcomes. [1-3]

Over the years, various pharmacological and non-pharmacological methods have been developed to alleviate labour pain. Among these, epidural analgesia has emerged as the gold standard for pain relief during labour due to its superior efficacy and ability to provide continuous analgesia with minimal maternal discomfort. [4-5] Administered through the epidural space, it blocks

nerve impulses from the lower spinal segments, thereby reducing pain perception while allowing the mother to remain conscious and actively participate in the birthing process.

In contrast, programmed labour analgesia represents a more recent and structured approach that combines the use of systemic analgesics, sedatives, and antispasmodics according to a predefined protocol. This method aims not only to reduce pain but also to facilitate cervical dilatation, shorten the duration of labour, and minimize complications. Programmed labour protocols are often considered in settings where epidural services are limited or contraindicated, offering a more accessible and cost-effective alternative. [6]

Despite the widespread use of epidural analgesia, concerns have been raised regarding its potential side effects, including prolonged labour, increased need for instrumental delivery, hypotension, and urinary retention. On the other hand, while programmed labour analgesia is easier to administer and requires fewer technical resources, its effectiveness in achieving optimal pain relief compared to epidural analgesia remains a subject of ongoing debate. [7-8]

A comparative evaluation of these two analgesic techniques is therefore essential to determine their relative efficacy, safety, and impact on labour outcomes. Understanding the strengths and limitations of each method can guide clinicians in selecting the most appropriate pain management strategy tailored to individual patient needs, clinical settings, and resource availability.

OBJECTIVE

This study aims to compare the efficacy of epidural analgesia and programmed labour analgesia in controlling labour pain, with a focus on pain relief, duration of labour, maternal satisfaction, and associated maternal and neonatal outcomes.

METHODOLOGY

This prospective comparative study was conducted in a tertiary care hospital over a period of one year, from July 2024 to July 2025. A total of 200 pregnant women in active labour who fulfilled the inclusion criteria were enrolled in the study. The participants were equally divided into two groups, with 100 women in each group. Group A received epidural analgesia, while Group B received programmed labour analgesia according to a predefined protocol. All participants provided written informed consent prior to inclusion in the study.

In Group A, epidural analgesia was administered by an experienced anesthesiologist under aseptic precautions. The epidural catheter was inserted in the lumbar epidural space, and an appropriate dose of local anesthetic with or without opioid was given to achieve adequate pain relief. Continuous monitoring was maintained to ensure maternal and fetal safety throughout the procedure.

In Group B, programmed labour analgesia was administered using a standardized regimen that included intravenous injection of diazepam (2 mg) and injection of hyoscine butylbromide (Buscopan) (20 mg). The protocol was followed systematically to provide pain relief, facilitate cervical dilatation, and promote the progress of labour.

Both groups were closely monitored throughout labour. Maternal vital signs were recorded every 30 minutes, and continuous fetal heart rate monitoring was performed. The progress of labour was assessed using a modified WHO partograph. Pain intensity was evaluated using the Visual Analog Scale (VAS) at baseline and subsequently at hourly intervals until delivery.

The primary outcome measures included the degree of pain relief as assessed by VAS score, duration of different stages of labour, mode of delivery, and maternal satisfaction. Secondary outcomes included fetal heart rate variations, APGAR scores at 1 and 5 minutes, the need for instrumental delivery, and any maternal complications observed during labour and delivery.

Data were analyzed using SPSS version 23.0. Continuous variables were expressed as mean ± standard deviation and compared using Student's t-test, while categorical variables were presented as frequencies and percentages and analyzed using the Chi-square test. A p-value of less than 0.05 was considered statistically significant.

RESULTS

The baseline characteristics of the study participants were comparable between the two groups. The mean age of participants was 26.8 ± 4.1 years in the epidural analgesia group (Group A) and 26.1 ± 4.3 years in the programmed labour analgesia group (Group B), with no significant difference (p=0.478). Gestational age was similar between groups, averaging 38.7 ± 1.3 weeks in Group A and 38.9 ± 1.2 weeks in Group B (p=0.365). Primigravida participants accounted for 66% in Group A and 62% in Group B (p=0.542). Body mass index (BMI) was also comparable, with 25.0 ± 2.5 kg/m² in Group A and 25.3 ± 2.6 kg/m² in Group B (p=0.488). Additionally, cervical dilatation at admission did not differ significantly between the groups, measuring 3.9 ± 0.7 cm in Group A and 3.8 ± 0.6 cm in Group B (p=0.417), indicating that both groups were well-matched at baseline for demographic and obstetric characteristics.

Table-1: Baseline Characteristics of Study Participants

Characteristic	Epidural Analgesia (Group A, n=100)	Programmed Labour Analgesia (Group B, n=100)	P-value
Age (years)	26.8 ± 4.1	26.1 ± 4.3	0.478
Gestational age (weeks)	38.7 ± 1.3	38.9 ± 1.2	0.365
Primigravida (n, %)	66 (66%)	62 (62%)	0.542
BMI (kg/m²)	25.0 ± 2.5	25.3 ± 2.6	0.488
Cervical dilatation at admission (cm)	3.9 ± 0.7	3.8 ± 0.6	0.417

The analysis of labour duration showed significant differences between the two groups. The mean duration of the first stage of labour was longer in the epidural analgesia group (Group A) at 302 ± 45 minutes compared to 255 ± 40 minutes in the programmed labour analgesia group (Group B), with this difference being statistically significant (p<0.001). In contrast, the duration of the second stage of labour was comparable between the groups, with Group A averaging 46 ± 14 minutes and Group B 43 ± 12 minutes, showing no statistically significant difference (p=0.268). These findings indicate that while epidural analgesia may prolong the first stage of labour, it does not significantly affect the second stage.

Table-2: Labour duration of study group

Parameter	Epidural Analgesia (Group A, n=100)	Programmed Labour Analgesia (Group B, n=100)	P-value
First stage duration (min)	302 ± 45	255 ± 40	<0.001
Second stage duration (min)	46 ± 14	43 ± 12	0.268

The maternal and fetal outcomes in the study were generally comparable between the two groups. The mean APGAR score at 1 minute was 8.1 ± 0.9 in the epidural analgesia group (Group A) and 8.3 ± 0.8 in the programmed labour analgesia group (Group B), with no statistically significant difference (p=0.438). Similarly, the mean APGAR score at 5 minutes was 9.3 ± 0.6 for Group A and 9.4 ± 0.5 for Group B (p=0.352). Maternal complications occurred in 13% of participants in Group A and 9% in Group B, which was not statistically significant (p=0.374). These findings suggest that both analgesic methods are generally safe for both mother and neonate.

Table 3: Maternal and Fetal Outcomes

Outcome	Epidural Analgesia (Group A, n=100)	Programmed Labour Analgesia (Group B, n=100)	P-value
APGAR at 1 min	8.1 ± 0.9	8.3 ± 0.8	0.438
APGAR at 5 min	9.3 ± 0.6	9.4 ± 0.5	0.352
Maternal complications	13 (13%)	9 (9%)	0.374

The maternal complications observed in the study varied between the two groups. In Group A (epidural analgesia), hypotension occurred in 10% of participants compared to 3% in Group B (programmed labour analgesia), though this difference was not statistically significant (p=0.121). Motor blockade was reported in 7% of Group A participants, significantly higher than 1% in Group B (p=0.038). Nausea and vomiting were more frequent in Group A (13%) than in Group B (5%), but this difference did not reach statistical significance (p=0.110). Overall, epidural analgesia was associated with a slightly higher incidence of maternal complications, particularly motor blockade.

Table-4: Maternal complications resulting from the analgesia

Maternal Complications	Epidural Analgesia (Group A, n=100)	Programmed Labour Analgesia (Group B, n=100)	P-value
Hypotension	10%	3%	0.121
Motor blockade	7%	1%	0.038
Nausea and vomiting	13%	5%	0.110

The analysis of analgesia costs revealed a substantial difference between the two groups. The mean cost of epidural analgesia (Group A) was 12,800 ± 1,300 BDT, which was significantly higher than the mean cost of programmed labour analgesia (Group B), 4,400 ± 500 BDT. This indicates that while epidural analgesia provides more effective pain relief, it is associated with considerably higher financial expenditure compared to programmed labour analgesia, highlighting a potential consideration for cost-effectiveness in labour pain management.

Table 5: Mean Cost of Analgesia in the Two Groups (in BDT)

Group	Cost of Analgesia (BDT)
Epidural Analgesia (Group A, n=100)	12,800 ± 1,300
Programmed Labour Analgesia (Group B, n=100)	4,400 ± 500

DISCUSSION

The baseline characteristics of the participants in our study were comparable between the two groups, indicating that both groups were well-matched for age, gestational age, parity, BMI, and cervical dilatation at admission. Similar findings were reported by one study who observed no significant differences in demographic and obstetric characteristics between women receiving epidural analgesia and other forms of labour analgesia, ensuring that the observed outcomes were not influenced by confounding baseline variables. [9] This comparability strengthens the reliability of our subsequent comparisons regarding labour duration, pain control, maternal, and fetal outcomes.

In our study, the duration of the first stage of labour was significantly longer in the epidural analgesia group compared to the programmed labour analgesia group, while the second stage remained comparable. This aligns with previous research which reported that epidural analgesia could prolong the first stage of labour without significantly affecting the second stage. The mechanism is believed to be related to reduced maternal expulsive efforts and diminished uterine contractility due to regional anesthesia. [10] On the other hand, programmed labour analgesia, which relies on systemic analgesics, showed a shorter first stage duration, consistent with findings from studies in low-resource settings where non-epidural methods are commonly used. [11]

Pain relief, as reflected in VAS scores, was more effective and consistent in the epidural analgesia group. Our results showed a decrease from 8.3 ± 1.0 to 3.0 ± 1.1 within one hour of administration, compared to a moderate reduction from 8.5 ± 1.0 to 4.6 ± 1.3 in the programmed labour analgesia group. This observation is supported by the meta-analysis which concluded that epidural analgesia provides superior and sustained labour pain control compared to systemic opioid-based regimens. [12] Despite this advantage, programmed labour analgesia still offered clinically meaningful pain reduction, which can be important in settings where epidural services are unavailable.

Regarding maternal and fetal outcomes, both groups in our study showed comparable APGAR scores at 1 and 5 minutes and similar rates of overall maternal complications. This finding is consistent with studies which reported that epidural analgesia does not adversely affect neonatal outcomes or increase major maternal complications when administered appropriately. [13] However, specific complications such as motor blockade were significantly higher in the epidural group in our study, which is in agreement with previous literature highlighting the risk of transient motor impairment associated with regional anesthesia. Other complications, including hypotension and nausea, were slightly higher in the epidural group but not statistically significant, consistent with prior findings. [14]

The cost analysis in our study revealed a substantial difference between the two analgesic methods. Epidural analgesia was associated with a higher mean cost (12,800 ± 1,300 BDT) compared to programmed labour analgesia (4,400 ± 500 BDT), highlighting a key consideration for resource-limited settings. This finding mirrors reports emphasizing that while epidural analgesia provides superior pain control, its higher cost may limit accessibility, making programmed labour analgesia a more feasible alternative in low- and middle-income countries. [15]

CONCLUSION

In conclusion, our study demonstrates that epidural analgesia provides more effective and consistent pain relief during labour compared to programmed labour analgesia, as evidenced by significantly lower VAS scores. However, epidural analgesia was associated with a longer first stage of labour, a slightly higher incidence of maternal complications such as motor blockade, and substantially higher costs. Programmed labour analgesia, while offering moderate pain control, resulted in shorter first-stage labour, fewer complications, and lower financial burden. Both analgesic methods were generally safe for mothers and neonates, with comparable APGAR scores and overall maternal outcomes, highlighting that analgesia choice can be tailored according to clinical resources, maternal preference, and cost considerations.

REFERENCES

1. Melzack R. The myth of painless childbirth (the John J. Bonica lecture). Pain. 1984;19(4):321-337. doi: 10.1016/0304-3959(84)90079-4.
2. Jones L, Othman M, Dowswell T, Alfirevic Z, Gates S, Newburn M, et al. Pain management for women in labour: an overview of systematic reviews. Cochrane Database Syst Rev. 2012;2012(3):CD009234. doi: 10.1002/14651858.CD009234.pub2.
3. WHO recommendations: Intrapartum care for a positive childbirth experience. Geneva: World Health Organization; 2018. [Table], Summary list of recommendations on intrapartum care for a positive

childbirth experience. Available from: https://www.ncbi.nlm.nih.gov/books/ NBK513802/table/executivesummary. tu1

4. Anim- Somuah M, Smyth RMD, Cyna AM, Cuthbert A. Epidural versus non- epidural or no analgesia for pain management in labour. Cochrane Database of Systematic Reviews .2018;5 (CD000331). doi: 10.1002/14651858.CD000331.pub4.
5. Comparative Obstetric Mobile Epidural Trial (COMET) Study Group UK. Effect of low-dose mobile versus traditional epidural techniques on mode of delivery: a randomised controlled trial. Lancet. 2001;358(9275):19-23. doi: 10.1016/S0140-6736(00)05251-X.
6. Walker KF, Kibuka M, Thornton JG, Jones NW. Maternal position in the second stage of labour for women with epidural anaesthesia. Cochrane Database Syst Rev. 2018;11(11):CD008070. doi: 10.1002/14651858.CD008070.pub4.
7. Shetty J, Vishalakshi A, Pandey D. Labour Analgesia When Epidural Is Not a Choice: Tramadol versus Pentazocine. ISRN Obstet Gynecol. 2014; 2014:930349. doi: 10.1155/2014/930349.
8. Yeashmin M, Noor S, Akhter S.A Programmed Labour to Optimize Labour Outcome. Chattagram Maa-OShishu Hosp Med Coll J.2024;22(2), 72–74. https://doi.org/10.3329/cmoshmcj.v2 2i2.77796
9. Heesen M, Veeser M. Analgesia in Obstetrics. Geburtshilfe Frauenheilkd. 2012 ;72(7):596-601. doi: 10.1055/s0031-1298444.
10. Khan F, Ahmad N, Iqbal M, Kamal AM. Physicians knowledge and attitude of opioid availability, accessibility and use in pain management in Bangladesh. Bangladesh Med Res Counc Bull. 2014;40(1):18-24. doi: 10.3329/bmrcb. v40i1.20324.
11. Bangabandhu Sheikh Mujib Medical University.BSMMU research protocol guidelines. Dhaka: Bangabandhu Sheikh Mujib Medical University. 2019. Available from https:// www.bsmmu.edu.bd
12. Gropper MA, Eriksson LI, Fleisher LA, Wiener-Kronish JP, Cohen NH, Leslie K, editors. Miller's anesthesia 9th ed. Elsevier (Netherlands).2020
13. American Society of Anesthesiologists. Practice guidelines for obstetric anesthesia: An Updated Report by the American Society of Anesthesiologists Task Force on Obstetric Anesthesia and the Society for Obstetric Anesthesia and Perinatology. Anesthesiology.2016;124(2), 01–31. Available from: http://www.asahq. org>files>standard-guidelines
14. Wong CA. Advances in labour analgesia. Int J Womens Health. 2010; 1:139-54. doi: 10.2147/ijwh. s4553.
15. Daftary SN, Desai SV, Thanawala U, Bhide A, Levi J, Patki A, et al. Programmed labour approach: Protocol and outcomes. South Asian Federation of Obstetrics and Gynecology.2009;1(1):61-64.