International Journal of Reproduction, Contraception, Obstetrics and Gynecology
Khatun M et al. Int J Reprod Contracept Obstet Gynecol. 2025 Jan;14(1):13-17
www.ijrcog.org
pISSN 2320-1770 | eISSN 2320-1789

DOI: https://dx.doi.org/10.18203/2320-1770.ijrcog20243920

Original Research Article

Assessment of the effects of epidural labour analgesia on the second stage of labour

Marufa Khatun[1]*, Sharmina Siddique[2], Rawshan Ara Sultana[2], Dilruba Yasmin[3], Tamanna Rahman[2], Asma Akter[4]

[1]Medical Officer, Upazila Health Complex, Mithapukur, Rangpur, Bangladesh
[2]Department of Obstetrics and Gynecology, Dhaka Medical College Hospital, Dhaka, Bangladesh
[3]Department of Obstetrics and Gynecology, District Sadar Hospital, Sherpur, Bangladesh
[4]Indoor Medical Officer, Dhaka Medical College Hospital, Dhaka, Bangladesh

Received: 16 October 2024
Accepted: 09 December 2024

***Correspondence:**
Dr. Marufa Khatun,
E-mail: marufa.dmc.k67@gmail.com

ABSTRACT

Background: The second stage of labour is very important when the actual delivery of the baby takes place. This study aimed to evaluate the effects of epidural labour analgesia on the second stage of labour.
Methods: This quasi-experimental study was carried out in Dhaka Medical College Hospital, for one-year period from July 2021 to June 2022 after ethical approval. A total of 100 admitted pregnant women (37 weeks to 41 weeks) in labour ward were included in the study according to the inclusion and exclusion criteria. Among them 50 women were in group A (with epidural analgesia) and another 50 women were in group B (without epidural analgesia). A detailed history and thorough clinical examination were carried out in each patient. Data were collected in separate case-record form and analyzed by SPSS 24.
Results: Mean age, gestational age, parity were statistically similar in both Group A and Group B. Duration of second stage of labour (52.18±37.72 versus 46.2±31.42 minutes, p=0.499) in nulliparous and (34.65±21.17 versus 29.2±14.72 minutes, p=0.364) in multiparous women was comparable in the two groups. Besides, both Group A and Group B had statistically similar APGAR score at 1st (8.66±0.87 and 8.80±0.83 respectively, p=0.414) and 5th minute (9.66±0.68 and 9.74±0.59 respectively, p=0.537).
Conclusions: Epidural labour analgesia can be safely recommended as a method of pain relief during labour, provided the necessary conditions are met. It does not have a significant adverse effect on the duration of the second stage of labour.

Keywords: Epidural labour analgesia, Second stage of labour, APGAR score

INTRODUCTION

One of the most intense and severe forms of pain experienced by humans is labour pain. It progressively worsens as labour advances and is often heightened by anxiety, fear, and lack of knowledge. The main effects of labour pain include elevated carbon dioxide levels (hypercarbia), loss of consciousness, and reduced blood flow to the uterus.[1] Several pharmacological and nonpharmacological methods have been used for pain relief in labour. Non-pharmacological methods such as massage, psychological relaxation techniques, transcutaneous electrical nerve stimulation (TENS), aromatherapy, hypnosis, acupuncture, deep breathing, and hydrotherapy may offer relief for mild pain, though there is insufficient evidence to fully support their effectiveness. Among pharmacological options, Entonox (a mixture of 50% nitrous oxide and oxygen) fails to provide adequate pain relief in 30-40% of patients and poses occupational risks to healthcare workers. Systemic opioids can have

depressant effects on both the mother and baby. Epidural analgesia is considered the most effective pain relief method during labour, as it provides complete analgesia without adverse effects on the mother or fetus.[2] Epidural analgesia is a form of regional anesthesia that blocks pain in a specific area of the body. It works by inhibiting nerve impulses from the lower spinal segments, effectively reducing pain in that region. The primary goal of epidural analgesia is to provide pain relief during labour.[3] In developed countries, up to 50% of all women in labour use epidural analgesia, with the rate rising to as high as 81% among first-time mothers (nulliparous parturients).[4] Epidural analgesia reduces epinephrine levels, which help improve uterine contractions and placental blood flow. However, if it is discontinued during the second stage of labour, it can lead to increased pain and ineffective pushing.[5,6] Despite its effectiveness, epidural analgesia carries certain risks.[7] Studies have shown that epidural analgesia is linked to a prolonged second stage of labour and an increased risk of operative vaginal delivery. However, these findings are based on a wide range of obstetric anesthesia practices, varying obstetrical skills, and differing guidelines for interventions. As a result, the reported impact of epidural analgesia on the mode of delivery is highly influenced by abnormalities in the second stage of labour and the specific practices within different delivery settings.[4,8] Epidural analgesia during labour can induce maternal changes that may affect both the mother and baby. It has been associated with side effects such as hypotension, fever, prolonged labour and delivery, increased need for oxytocin, and a higher likelihood of instrumental delivery. Additionally, the use of epidural analgesia has been linked to dystocia, or abnormal labour progression.[9] Patients receiving epidurals are more likely to need oxytocin for labour augmentation, experience prolonged second stages of labour, and exhibit persistent occipitoposterior fetal malposition.[7] This study aimed to evaluate the effects of epidural labour analgesia on the second stage of labour.

METHODS

This quasi-experimental study was carried out in the Department of Obstetrics and Gynecology in collaboration with the Department of Anesthesia, Analgesia, Palliative and Intensive Care Medicine, Dhaka Medical College Hospital, Dhaka from July 2021 to June 2022. Pregnant women who were admitted in labour ward at term (37 weeks to 41 weeks) during the study period were considered as study population. Purposive sampling technique was adopted in this study. A total of 100 patients fulfilled the inclusion and exclusion criteria, among them 50 patients were in group A who underwent epidural analgesia and another 50 patients were in group B without epidural analgesia. A structured data collection form was developed containing all the variables of interests. Data was collected by interview, observation and clinical examination. After giving a test dose of 3 ml of 2% lignocaine with adrenalin, analgesia was provided by bolus injection of 10 ml bupivacaine 0.1% containing fentanyl 2 microgram/ml followed by an intermittent bolus infusion of 10 ml bupivacaine 0.1% containing fentanyl 2 microgram/ml hourly and additional top up doses of 5 ml of same solution was given for management of breakthrough pain if required. The patients were monitored according to partograph protocol. Oxytocin augmentation was done starting at the dose of 2.5 mU/minute, increased by increments of 2.5 mU/minute every 15 minutes until uterine contraction is 3 in 10 minutes each lasting for >40 seconds. All necessary data were recorded and were put in an excel sheet and analysed using SPSS, 24th version. Continuous data were expressed as mean and standard deviation and categorical data were expressed as frequency and percentage. To determine the association between categorical variables, chi square test and Fisher Exact test were done. To determine the difference between continuous variables, independent sample t test was done. Statistical significance was set as 95% confidence level at 5% acceptable error level ($p<0.05$). Ethical clearance was taken from ethical review committee (ERC).

Inclusion criteria

Patients with term alive singleton pregnancy (37-41 weeks) with vertex presentation. Women in labour diagnosed by regular uterine contractions and at least 4 cm cervical dilatation. Age: 18-35 years. Normal foetal heart rate pattern (CTG) before starting epidural analgesia.

Exclusion criteria

Women who did not reach second stage of labour. Contracted pelvis/cephalopelvic disproportion. Any uterine scar like previous LSCS, myomectomy. Any medical or obstetric high risk factors. Placenta previa. Any foetal congenital anomaly. Anatomical deformity of spine or any local infection.

RESULTS

Majority of the women were aged below or equal 30 years among both group A (88%) and group B (82%). Mean age of group A and group B was 22.4±4.5 years and 22.9±5.2 years accordingly (Table 1).

Table 1: Age distribution of the study participants (n=100).

Age group (years)	Group A (n=50)	Group B (n=50)	P value
≤30	44 (88)	41 (82)	0.577(C)
>30	6 (12)	9 (18)	
Mean±SD	22.4±4.5	22.9±5.2	0.639(t)
Total	50 (100)	50 (100)	

P value was determined by (C) Chi-square test and (t) independent sample t test.

The majority of the participants had gestational age within 37 to 40 weeks in both groups. No significant difference

was found between both groups regarding gestational age (Table 2).

Table 2: Distribution of the study participants according to gestational age (n=100).

Gestational age (weeks)	Group A (n=50)	Group B (n=50)	P value
37-40	45 (90)	46 (92)	1.00(C)
>40	5 (10)	4 (8)	
Mean±SD	38.2±1.3	38.1±1.3	0.759(t)
Total	50 (100)	50 (100)	-

P value was determined by (C)Chi-square test and (t)Independent sample t test.

In group A, 66% patients were nullipara and 34% patients were multipara whereas in group B, 60% patients were nullipara and 40% patients were multipara. Parity was statistically similar in both group A and group B (p value 0.679) P value was determined by Chi-square test. (Figure 1).

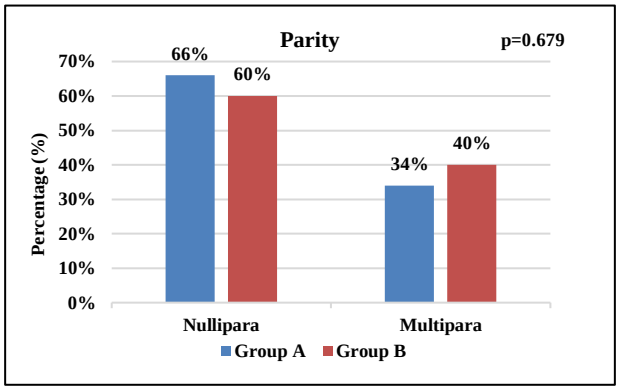

Figure 1: Distribution of the study participants according to parity (n=100).

Duration of second stage labour in nulliparous women in group A and group B was statistically similar and result was insignificant (Table 3).

Table 3: Duration of second stage labour among the nullipara study participants (n=63).

Duration of second stage labor	Group A (n=33)	Group B (n=30)	P value
	N (%)	N (%)	
≤2 hour	28 (84.8)	26 (86.7)	1.00(F)
>2 hour	5 (15.2)	4(13.3)	
Mean±SD (minutes)	52.18±37.72	46.2±31.42	0.499(t)

P value was determined by (F)Fisher Exact test and (t)Independent sample t test.

Duration of second stage labour in multiparous women in group A and group B was statistically similar and result was insignificant (Table 4).

Table 4: Duration of second stage labour among the multipara study participants (n=37).

Duration of second stage labor	Group A (n=17)	Group B (n=20)	P value
	N (%)	N (%)	
≤1 hour	15 (88.2)	19 (95)	0.584(F)
>1 hour	2 (11.8)	1 (5)	
Mean±SD (minutes)	34.65±21.17	29.2±14.72	0.364(t)

P value was determined by (F)Fisher Exact test and (t)Independent sample t test.

No significant difference was found between both groups regarding neonatal outcome (Table 5).

Table 5: Neonatal outcome among both groups (n=100).

Birth history of neonates	Group A (n=50)	Group B (n=50)	P value
Gender			
Male	31 (62)	29 (58)	0.838(C)
Female	19 (48)	21 (42)	
Weight in kg (mean±SD)	2.86±0.27	2.88±0.26	0.684(t)
APGAR score at 1 minutes (mean±SD)	8.66±0.87	8.80±0.83	0.414(t)
APGAR score at 5 minutes (mean±SD)	9.66±0.68	9.74±0.59	0.537(t)

P value was determined by (C)Chi-square test and (t)Independent sample t test.

DISCUSSION

The mean age group of the women in our study was 22.4±4.5 years in group A and 22.9±5.2 years in group B. Majority of the women were aged below or equal 30 years among both groups. This is comparable to the study conducted by Deshmukh et al where the mean age of the patients was 21.96±3.07 years in study group and 21.90±3.20 years in control group.[1] Another study conducted by Deepak at al also had patients with mean age 21.83±2.61 years and 21.54±4.06 years in the study and control respectively.[10] In the present study mean gestational age of participants was 38.2±1.3 weeks in group A and 38.1±1.3 weeks in group B. Majority of the participants were between 37 to 40 weeks of gestational age. In the study of Deshmukh et al, the mean gestational age was 38.46 weeks in control group and 38.44 weeks in study group.[1] In this study, in group A, 66% patients were nullipara and 34% patients were multipara whereas in group B, 60% patients were nullipara and 40% patients were multipara. Parity was statistically similar in both group A and group B. Similarly in the study of Papalkar et al majority of the patients were primigravida in both group A and B.[11] In this study, among the nulliparous women,

mean duration of second stage of labour was 52.18±37.72 minutes in group A and 46.2±31.42 minutes in group B. Among the multiparous women, mean duration of second stage of labour was 34.65±21.17 minutes in group A and 29.2±14.72 minutes in group B. Duration of second stage of labour in both nulliparous and multiparous women was higher in group A than group B but statistically result was insignificant (p value 0.499 and 0.364 respectively). In the study, second stage was prolonged in seven patients of group A (five nullipara and two multipara) and five patients of group B (four nullipara and one multipara) Again result was statistically similar in both the groups. These were comparable to the previous study by Deshmukh et al revealed that the duration of the second stage of labour in the study and control groups was comparable.[1] There was no prolongation of the second stage of labour. This finding was probably due to adequate hydration of mothers and the use of an appropriate dose of analgesic. However, a study by Naito et al demonstrated increased duration of both the first and second stages of labour with epidural analgesia.[12] Similarly other studies have shown second-stage labour prolongation with the use of epidural analgesia.[10,13,14] This has been attributed to motor blockade with concomitant weakness of pelvic floor muscles that reduces the effective maternal pushing and involuntary bearing down reflex.[15] In this study, APGAR score at 1 minute and 5 minutes was 8.66±0.87 and 9.66±0.68 in group A and 8.80±0.83 and 9.74±0.59 in group B. No significant differences were found between both groups regarding, gender, birth weight, and APGAR score. In the study of Deepak et al 1-minute APGAR score was found to be lower in the study group but the APGAR at 5 minutes in the two groups did not show any significant difference.[10] Cochrane review by Anim-Somuah et al also found no differences between groups in neonatal outcomes in terms of APGAR score at 5 minute.[16] Naito et al also observed the outcomes of the neonates and found there were no clinical differences between the two groups.[12]

Limitation of the study researcher's efforts to ensure optimal care throughout the study, there were some limitations: The study was conducted in a single, selected hospital, which may not represent the broader community. Due to time constraints, the sample size was relatively small. The sample was selected purposively, which may introduce bias and influence the results. The duration of the study and follow-up period were shorter compared to other studies.

CONCLUSION

According to the current study findings, the use of epidural analgesia did not result in a prolonged second stage of labour nor did it adversely affect neonatal outcomes. Therefore, epidural labour analgesia can be considered as a safe and effective method for pain relief during labour where facilities are available.

Recommendations

Epidural labour analgesia can be safely recommended as a method of labour analgesia when the prerequisites are fulfilled. Larger well designed multicenter randomized control trial with longer follow up is recommended to validate this finding.

Funding: No funding sources
Conflict of interest: None declared
Ethical approval: The study was approved by the Institutional Ethics Committee

REFERENCES

1. Deshmukh VL, Ghosh SS, Yelikar KA, Gadappa SN. Effects of epidural labour analgesia in mother and foetus. J Obstet Gynecol India. 2018;68(2):111-6.
2. Lam KK, Leung MK, Irwin MG. Labour analgesia: update and literature review. Hong Kong Med J. 2020;26(5):413.
3. Sahu RR, Shivgan SM. To study the effect of epidural analgesia on second stage of labour and mode of delivery. Indian J Obstet Gynecol Res. 2018;5(4):553-8.
4. Srebnik N, Barkan O, Rottenstreich M, Ioscovich A, Farkash R, Rotshenker-Olshinka K, et al. The impact of epidural analgesia on the mode of delivery in nulliparous women that attain the second stage of labor. J Matern Fet Neonat Med. 2020;33(14):2451-8.
5. Munro A, George RB, Allen VM. The impact of analgesic intervention during the second stage of labour: a retrospective cohort study. Canadian J Anesth. 2018;65(11):1240-7.
6. Lee L, Dy J, Azzam H. Management of spontaneous labour at term in healthy women. J Obstet Gynaecol Canada. 2016;38(9):843-65.
7. Penuela I, Isasi-Nebreda P, Almeida H, López M, Gomez-Sanchez E, Tamayo E. Epidural analgesia and its implications in the maternal health in a low parity comunity. BMC Pregnancy Childbirth. 2019;19:1-9.
8. Shmueli A, Salman L, Orbach-Zinger S, Aviram A, Hiersch L, Chen R, et al. The impact of epidural analgesia on the duration of the second stage of labor. Birth. 2018;45(4):377-84.
9. Rimaitis K, Klimenko O, Rimaitis M, Morkunaite A, Macas A. Labour epidural analgesia and the incidence of instrumental assisted delivery. Medicina. 2015;51(2):76-80.
10. Deepak D, Kumari A, Mohanty R, Prakash J, Kumar T, Priye S. Effects of epidural analgesia on labour pain and course of labour in primigravid parturients: a prospective non-randomized comparative study. Cureus. 2022;14(6):1-8.
11. Papalkar J, Shrivastava D, Hariharan C. Epidural analgesia in labour. Int J Biol Med Res. 2013;4(1):2707-12.
12. Naito Y, Ida M, Yamamoto R, Tachibana K, Kinouchi K. The effect of labor epidural analgesia on labor, delivery, and neonatal outcomes: a propensity score-

matched analysis in a single Japanese institute. JA Clin Rep. 2019;5:1-7.
13. Indraccolo U, Ripanelli A, Di Iorio R, Indraccolo SR. Effect of epidural analgesia on labour times and mode of delivery: A prospective study. Clin Exp Obstet Gynecol. 2012;39(3):310-3.
14. Cheng YW, Hopkins LM, Caughey AB. How long is too long: Does a prolonged second stage of labour in nulliparous women affect maternal and neonatal outcomes? Am J Obstet Gynecol. 2004;191(3):933-8.
15. Traynor AJ, Aragon M, Ghosh D, Choi RS, Dingmann C, Tran ZV, et al. Obstetric anesthesia workforce survey: a 30-year update. Anesth Analg. 2016;122(6):1939-46.
16. Anim-Somuah M, Smyth RM, Cyna AM, Cuthbert A. Epidural versus non-epidural or no analgesia for pain management in labour. Cochrane Database Syst Rev. 2018(5):1.

Cite this article as: Khatun M, Siddique S, Sultana RA, Yasmin D, Rahman T, Akter A. Assessment of the effects of epidural labour analgesia on the second stage of labour. Int J Reprod Contracept Obstet Gynecol 2025;14:13-7.