

ORIGINAL ARTICLE

Role of Levobupivacaine and Fentanyl in Second Stage of Labour: An Observational Study

Afsana Ferdousy¹, Mohammad Shafiqul Islam², Sadia Ahmed³, Md. Mursalinur Rahman³, Shamima Nasrin³, Md Mostafa Kamal⁴, AKM Akhtaruzzaman²

DOI: <https://doi.org/10.62848/bjpain.v4i2.8516>

Received: 12 August 2024

Accepted: 20 October 2024

Abstract

Background: To achieve adequate analgesia with a possible non-significant motor block, the American Society of Anaesthesiologists (ASA) recommended using a minimal concentration of local anaesthetics for labour epidurals. However, the concentration of local anaesthetics needs to increase to achieve effective analgesia in the second stage, as more recruitment of A- δ fibre occurs. This study compared the effects of the epidural bolus of Levobupivacaine-Fentanyl and Bupivacaine-Fentanyl in the second stage of labour.

Methods: This study was carried out from April 2023 to March 2024 at the labour suit of the Department of Obstetrics and Gynaecology of Bangladesh Medical University (BMU) and Mohammadpur Fertility Services and Training Centre (MFSTC), Dhaka, under the supervision of the Department of Anaesthesia, Analgesia, and Intensive Care Medicine, BMU. Parturient requesting labour analgesia, satisfying the inclusion criteria were randomly divided equally into Groups LF (Levobupivacaine and Fentanyl) and BF (Bupivacaine and Fentanyl). Epidural was performed at the first stage of labour (cervical dilatation ≥ 4 cm) and an epidural dose of 6 ml of 0.1% levobupivacaine with fentanyl 2 μ g/ml through the epidural catheter was administered. Degree of analgesia by VAS, motor block by Bromage scale, foetal heart rate, and blood pressure were assessed at 5, 15, and 30 minutes after epidural dosage and then hourly till delivery. At the late second stage of labour, an epidural bolus dose of 12 ml of 0.1% Bupivacaine-Fentanyl solution in group BF and 12 ml of 0.1% Levobupivacaine-Fentanyl solution in group LF was administered. After bolus, the duration of the second stage of labour, mode of delivery, and maternal satisfaction by Likert scale were measured.

Results: The study involved 44 participants who were statistically matched for age, BMI and gestational age. Pain intensity was measured by the Visual Analogue Scale (VAS), the baseline VAS scores before the bolus had a slightly lower score in the BF group ($P = 0.426$) and after the bolus administration, the LF group showed a significantly lower VAS score than the BF group ($P = 0.001$). The LF group had a notably shorter second stage (22.75 ± 9.97) compared to the BF group (52.67 ± 17.19) ($p < 0.05$). Maternal satisfaction favoured LF and superior analgesic effectiveness ($p < 0.005$).

Conclusion: The study demonstrates that epidural administration of levobupivacaine-fentanyl in the second stage achieved better analgesia, significantly shorter duration, and remarkable maternal satisfaction in comparison to bupivacaine-fentanyl.

Keywords: Epidural, labour analgesia, levobupivacaine, bupivacaine

1. Specialist, Department of Anaesthesia, BRB Hospital Limited, Panthapath, Dhaka

2. Professor, Department of Anaesthesia, Analgesia and Intensive Care Medicine, Bangladesh Medical University, Dhaka

3. Resident, Department of Anaesthesia, Analgesia and Intensive Care Medicine, Bangladesh Medical University, Dhaka.

4. Anaesthesiologist, Department of Anaesthesia, Intensive Care and Pain Medicine, Shaheed Suhrawardy Medical College and Hospital, Dhaka.

Correspondence:

Afsana Ferdousy
afsana.akhee88@gmail.com

Citation: Ferdousy A, Islam MS, Ahmed S, Rahman MM, Nasrin S, Kamal MM, Akhtaruzzaman AKM. Role of Levobupivacaine and Fentanyl in Second Stage of Labour: An Observational Study. Bangladesh J. Pain 2024; 4(2): 11-17; doi:10.62848/bjpain.v4i2.8516

Introduction

Most women experience pain during labour and after giving birth. The World Health Organisation (WHO) designates pain management as a standard quality of care, emphasising the need to provide all aspects of health care in a timely, appropriate manner while respecting a woman's choice, culture, and circumstances¹.

There are three phases of labour: the first, second, and third stages. The time that passes between the commencement of full cervical dilation and the delivery of the foetus is referred to as the second stage of labour. It is further separated into two phases: the "active" phase, during which the mother makes expulsion efforts, and the "passive" phase, during which the presenting part gradually descends and rotates².

The late second stage of labour is characterised by the descent of the foetus and more frequent contractions of the uterus, which cause more pain. Various studies have demonstrated the potential benefits of effective analgesia in the late stages of labour for mothers, such as reduced levels of stress and anxiety, increased satisfaction with the birthing process, and maybe a shortened labour period³.

The American Society of Anaesthesiologists (ASA) recommends using a minimal concentration of local anaesthetics for epidural labour analgesia to achieve adequate analgesia with possible non-significant motor blockage. A minimum local anaesthetic concentration (MLAC) methodology is effective in relieving pain during labour, especially in the first stage. However, in the second stage, recruitment of A- δ fibres, along with C fibres, occurs in the pain pathway of labour, indicating that more local anaesthetics are required as labour progresses⁴.

The use of modern low-concentration epidural local anaesthetics is associated with a low incidence of motor block and can even allow the parturient to ambulate⁵. The three commonly used medications for epidural labour analgesia are ropivacaine, levobupivacaine, and bupivacaine. Ropivacaine and levobupivacaine are two new medications that have entered the field of obstetric analgesia⁶.

Usage of epidural bupivacaine should be restricted due to adverse effects such as cardiovascular toxicity and motor blockage. Levobupivacaine is a relatively novel local anaesthetic with bupivacaine-like effects. However, it is thought to be less harmful to the cardiovascular and central neurological systems. It has also reportedly been shown to reduce motor blockage. Whereas bupivacaine has both an S (-) and R (+) enantiomer, levobupivacaine is a pure S (-) enantiomer of racemic bupivacaine⁷.

Regarding the institution time of the first bolus epidural dose for relief of labour pain in the second stage, having different opinions. Considered to have a negative impact on the second stage of labour, some obstetric care providers discontinue epidural pain medication during this time. There are controversies regarding the possible impact of epidural analgesia on the second stage of labour. According to the majority of observational research, women who accepted epidural analgesia tend to have longer second-stage of labour and more assisted vaginal deliveries. However, stopping the epidural medication during the second stage could result in lower maternal satisfaction⁵. There are also some relations between early epidural placement and labour progression with the increased risk of caesarean delivery⁸. Therefore, this study aimed to compare the effects of levobupivacaine-fentanyl and bupivacaine-fentanyl in the second stage of labour without interfering normal delivery.

Methods

This prospective, comparative observational study was conducted at the labour suit of the Department of Obstetrics and Gynaecology of Bangladesh Medical University (BMU) and Mohammadpur Fertility Services and Training Centre (MFSTC), Dhaka from April 2023 to March 2024. Participants with ASA class II, aging 19-35 years, uncomplicated pregnancy, cephalic presentation, full term (> 37 weeks), cervical dilatation ≥ 4 cm, at least one uterine contraction every 2-3 min, height ≥ 140 cm and weight < 100 kg were included in this study. The exclusion criteria were as follows: parenteral opioids within 2 hours, hypersensitivity to drugs used for epidural analgesia, neurological or psychiatric disease, any irregularity in the foetal heart rate and inadequate pain control in the first stage (VAS > 3).

Study Procedures

Eligible parturients were enrolled in the study during admission to the labour ward and written informed consent were taken. They were randomly allocated equally into Groups LF (Levobupivacaine and Fentanyl) and BF (Bupivacaine and Fentanyl). Demographic and clinical data, including age, weight, height, gestational age, and cervical dilatation, were collected. Standard monitoring was employed, including non-invasive blood pressure, pulse oximetry, and fetal monitoring using cardiotocography (IOCARE, Model No. IC60). Intravenous (IV) access with an 18G cannula was established, and preload with Hartmann's solution was administered at 10 mL/kg. Baseline pain intensity was measured using the Visual Analogue Scale (VAS), along with mean arterial pressure (MAP), heart rate (HR), cervical dilatation and foetal heart rate (FHR).

Epidural procedure

When cervical dilatation reached ≥ 4 cm during the active phase of labour, an epidural catheter was inserted under aseptic conditions using an 18G Tuohy needle at the L2-L3 or L3-L4 level. The catheter was placed 3–4 cm into the epidural space and secured without a test dose. For epidural analgesia: Perifix One 401 Filter Set; Tuohy needle: 18G $\times$ 3.5", and Perifix catheter: 20G (B BRAUN, Germany) were used. The parturient was then positioned supine with left lateral displacement, and the head end of the bed was slightly elevated. An initial dose of 6 mL of 0.1% Levobupivacaine with fentanyl (2 μ g/mL) was administered. Labour progress, cervical dilatation, and fetal monitoring were documented using the WHO Labour Care Guide. Degree of analgesia, motor block, foetal heart rate, pulse rate and blood pressure were assessed at 5, 15, and 30 minutes after the epidural dose and then at an hourly interval throughout the labour. Intensity of pain was assessed by VAS score (0= no pain, 10=worst imaginable pain). After 30 minutes of epidural dose, if VAS is less than or equal to 3, then it was considered adequate analgesia. Breakthrough pain was managed by a 6 ml bolus epidural dose of 0.1% levobupivacaine with fentanyl 2 μ g/ml. Repetition of the dose usually takes 90 to 120 minutes intervals during the first stage. Motor block was bilaterally evaluated according to the Modified Bromage score. At the second stage of labour (cervical dilatation ≥ 10 cm), a bolus of 12 mL of the respective solution was admin-

istered: Levobupivacaine-fentanyl group (LF): 12 mL of 0.1% Levobupivacaine with fentanyl. Bupivacaine-fentanyl group (BF): 12 mL of 0.1% Bupivacaine with fentanyl. The duration of the second stage of labour, mode of delivery and maternal satisfaction by Likert scale were measured.

Statistical analysis:

All the relevant collected data were compiled on a master file in Microsoft Excel. Percentages were calculated to find out the proportion of the findings. The statistical analysis was done using the Statistical Package for Social Sciences version 23 for Windows (SPSS Inc, Chicago, Illinois, USA). Qualitative variables were expressed as percentages. Quantitative variables were expressed as mean $\pm$ standard deviation. Student's t-test, Fisher's exact test and Chi-square test were done to compare all the parameters between the groups. $p < 0.05$ were considered statistically significant.

Results

Forty-four (44) parturients were enrolled in this study according to the inclusion and exclusion criteria. Two parturients in group LF had a caesarian section due to foetal distress and one parturient in group BF had a caesarian section due to foetal distress before initiation of the second stage. Note that, these three patients had not received epidural bolus during the second stage of labour. Whereas, three parturients in group BF had a caesarian section due to prolongation of the second stage. So, in the second stage $n = 20$ in the LF group and $n = 18$ in the BF group. No parturient was excluded from the study due to intense block or inadequate analgesia.

Table I depicted the studied groups are statistically matched for age, BMI and gestational age. 84.1% of the sample fell within the age range of 18-24 years and Body Mass Index (BMI) fell within the range of 23-27.5 kg/m². Regarding gestational age, the maximum number of patients (52.2%) was within 39-40 weeks.

Table I: Demographic characteristics of the parturients (n = 44)

Variables	Frequency (n)	Percentages (%)
Age (years)		
18-24	37	84.1
≥25	7	15.9
Mean±SD	22.89±6.59	
Median (min-max)	21 (18-60)	
BMI (kg/m²)		
<18.5	1	2.3
18.5-23	1	2.3
23-27.5	37	84.1
>27.5	5	11.4
Gestational age (weeks)		
38+	3	6.8
39+	23	52.2
40+	18	40.9
Mean±SD	39.34±0.23	
Median (min-max)	39.5	
Total (n=44)	44	100

Values were expressed as frequency (percentage) and Mean ± SD.

Table II: Distribution of the participants according to baseline parameters (n=44)

Variables	LF	BF	p value
Pulse rate			
Mean±SD	89.0±1.54	91.27±6.7	0.449
SBP (mmHg)			
Mean±SD	120.91±6.83	120.45±8.44	0.845
DBP (mmHg)			
Mean±SD	75.45±5.09	75.68±9.65	0.902
Cervical dilatation (cm)			
Mean±SD	4.66±0.44	4.71±0.61	0.780
VAS score before the epidural			
Mean±SD	7±1.02	6.95±1.04	0.885
VAS score after 10 minutes of epidural activation			
Mean±SD	2.50±0.70	2.0±0	0.667
FHR (bpm)			
Mean±SD	137.45±3.81	137.32±4.70	0.916

Values were expressed as Mean ± SD.

Table II showed no significant difference in baseline parameters between groups. The assessed baseline parameters are pulse rate (p = 0.449), systolic blood pressure (p = 0.845), diastolic blood pressure (p = 0.902), cervical dilatation (p = 0.780), pain intensity in 10 points VAS before the epidural (p = 0.885) and VAS score after 10 minutes of epidural activation (p = 0.667). Foetal heart rate was within the normal range in both groups (p= 0.916).

Table III: Pain intensity by visual analogue scale at the second stage of labour (n=38)

VAS	LF group (n=20)	BF group (n=18)	p value
VAS scoring points before the bolus			
Score 2 (>3)	5 (25%)	2 (9.5%)	0.238 ns
Score 3 (>5)	15 (75%)	19 (90.5%)	
VAS before bolus	6.48±1.21	6.15±1.38	0.437ns
VAS after bolus	2.05±0.22	3.50±1.14	<0.001s

Values were expressed as frequency (percentage) and mean ± SD

The baseline VAS scores before the bolus were quantified, and the BF group had a slightly lower score (p = 0.426). After the bolus administration, the LF group showed a markedly lower VAS score than the BF group (p< 0.001), which was highly significant. (Table III)

The mean duration of the first stage in the LF group is 198.18 ± 113.71 and in the BF group 192.27±83.62 (p = 0.537). The duration of the second stage in the LF group had a mean duration of 22.75±9.97. In contrast, the BF group had a significantly longer duration of 52.67 ± 17.19 (p = 0.001), which was highly significant. Table IV demonstrated the duration of labour of the two studied groups.

Table IV: Duration of labour between two groups

Duration of labour (min)	LF group	BF group	p value
First stage	198.18±113.71 (n=22)	192.27 ± 83.62 (n=22)	0.537
Second stage	22.75±9.97 (n=20)	52.67±17.19 (n=18)	<0.001

Values were expressed as Mean ± SD.

Table V showed that 81.8% of patients in the LF group and 50% in the BF group gave birth through NVD ($p=0.173$). The percentage of Caesarean section was substantially higher in the BF group (18.2%) than in the LF group (9.1%), ($p=0.192$). Although the percentages are different, the result fails to reach a significant level.

Table V: Frequency of mode of delivery between two groups (n = 44)

Mode of delivery	LF group (n=22)	BF group (n=22)
NVD	18 (81.8%)	11 (50%)
Instrumental delivery		
Ventouse	2 (9.1%)	4 (18.2%)
Forceps	0	3 (13.6%)
Caesarean section	2 (9.1%)	4 (18.2%)

Data expressed as absolute number, within parenthesis percentage over column total.

More patients were satisfied in the LF group than in the BF group. Maternal satisfaction was significantly more ($p=0.023$) in the LF group. (Table VI)

Table VI: Assessment of maternal satisfaction regarding pain relief by Likert scale at the second stage of labour (n=38)

Likert scale	LF group (n=20)	BF group (n=18)
Completely dissatisfied	0	0
Dissatisfied	0	0
Neutral	1 (5%)	7 (38.9%)
Satisfied	14 (70%)	10 (55.6%)
Completely satisfied	5 (25%)	1 (5.5%)

Data expressed as absolute number, within parenthesis percentage over column total.

The APGAR score of the neonate in group LF was 7.65 ± 0.87 and 8.80 ± 0.41 in 1st and 5th minute, respectively. In group BF it was 8.0 ± 0 and 8.80 ± 0.41 in 1st and 5th minute, respectively. There was no difference between the two groups for the APGAR score in 1st minute ($p=0.096$) and 5th minute ($p=1.00$).

Discussion

Postoperative Labour analgesia aims to achieve the best possible pain relief while minimising the potential for motor block from local anaesthetics. Motor block can be eliminated successfully in the early stages of labour by administering appropriate analgesia with a low dosage of local anaesthetics.

In this current study, local anaesthetic concentration was increased by epidural boluses of levobupivacaine-fentanyl and bupivacaine-fentanyl in two groups. Before giving epidural bolus at the second stage of labour, the VAS score was higher but the difference between groups was statistically insignificant ($p=0.437$). This higher score of VAS in both groups supports the statement of Capogna et al. (1998) that more local anaesthetics are needed as labour progresses⁹. However, in the second stage after bolus administration, both groups achieved analgesia, with a greater effect observed in the LF group ($p=0.001$). This result is somewhat similar to the findings of Sharmin et al. (2022) that, during delivery, the levobupivacaine group had a lower pain intensity than the lignocaine group ($p=0.001$)¹⁰.

This study reveals that the duration of the second stage was significantly shorter in the LF group compared to the BF group ($p<0.05$). However, in the study of Shen et al. (2017), only a 3.3% variation was observed in the length of the second stage of labour⁵. In the present study, 81.8% of parturients had NVD in group LF, and 50% had NVD in the BF group. Though a minimum concentration of bupivacaine was used due to its potent motor-blocking capacity, the bupivacaine group had a higher instrumental delivery rate (31.8%) than the levobupivacaine. This incident supports the statement of Aragao et al. (2019) that the incidence of the motor block and the instrumental delivery rate increases with the increment of concentration of local anaesthetics¹¹.

Mishra et al. (2017) compared 0.125% levobupivacaine with clonidine and 0.125% levobupivacaine with fentanyl in epidural labour analgesia¹². In his study, the instrumental delivery rate was similar (16%) in both groups, which is consistent with the present study (18.2%). Kumar et al. (2017) showed the incidence of instrumental delivery with 0.1% levobupivacaine was 32% and nil with 0.1% ropivacaine¹³. But in the current study, only 9.1% of patients in the LF group required instrumental delivery. Whereas Rani et al. (2018) reduced the concentration of local anaesthetics (0.08% levobupivacaine and 0.08% ropivacaine) and the incidence of instrumental delivery rate was 6.45% and 4.45% respectively¹⁴. The results slightly differ from the present study may be due to the use of a minimum concentration (0.08%) of local anaesthetics.

In the present study, two parturients in group LF and one parturient in group BF had a caesarian section due to foetal distress before initiation of the second stage and these three patients had not received epidural bolus during the second stage of labour. Whereas, three parturients in group BF had a caesarian section due to prolongation of the second stage, but no such incidence happened in the LF group.

In our study, the APGAR score of neonates at the 1st minute ($p = 0.096$) and 5th minute ($p = 1.00$) was identical in the levobupivacaine and bupivacaine groups without any significant statistical difference. Kamal et al. (2021) observed the effect of labour epidural analgesia on neonatal outcome and reported that the APGAR score was more than 7 in 1st and 5th minute in more than 93% of the patients¹⁵. Another study conducted by Hosagoudar et al. (2018) found that the APGAR score of neonates was similar in epidural analgesia group and opioid group¹⁶. The result is also consistent with the findings of other previous study¹⁷.

Conclusion

The study demonstrated that levobupivacaine-fentanyl provided significantly better pain relief compared to bupivacaine-fentanyl, as evidenced by lower VAS scores. Additionally, the shorter second stage of labour, reduced the intensity of pain, and greater maternal satisfaction were observed in the levobupivacaine-fentanyl group.

Declaration

Ethics approval

The study was approved by the Institutional Review Board of BMU (Regi. No 4662, BMU/2023/9028).

Author contributions

Conception and development of the idea AF, MSI

Writing AF

Data analysis AF, SA, MMK

Data collection AF, MMR, SN, SA

Review and Editing AF, AKMA

Funding: This study was funded by a research grant provided by Bangladesh Medical University, Dhaka-1000, Bangladesh.

Conflict of interests: None

References

- 1 McCauley M, Actis Danna V, Mrema D, van den Broek N. "We know it's labour pain, so we don't do anything": health-care provider's knowledge and attitudes regarding the provision of pain relief during labour and after childbirth. *BMC Pregnancy Childbirth* 2018; 18:444. <https://doi.org/10.1186/s12884-018-2076-7>
- 2 Cohen WR, Friedman EA. The second stage of labor. *American Journal of Obstetrics & Gynecology* 2024; 230(93): S865 - S875
- 3 Miller T, Garcia R, Thompson, K. Maternal satisfaction and pain relief during labor: The role of analgesia. *Obstetrics & Gynecology* 2020; 135(4): 789-795.
- 4 Apfelbaum JL, Hawkins JL, Agarkar M, Bucklin BA, Connis RT, Gambling DR, Mhyre J, Nickinovich DG, Sherman H, Tsen LC, Yaghmour ETA. 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): 270-300.
- 5 Shen X, Li Y, Xu S, Wang N, Fan S, Qin X, Zhou C, Hess PE. Epidural Analgesia During the Second Stage of Labor: A Randomized Controlled Trial. *Obstet Gynecol.* 2017; 130(5):1097-1103. doi: 10.1097/AOG.0000000000002306. PMID: 29016499.
- 6 Thammaiah SH, Sreenath RH, Swamy AHM, Kumararadhya GB, Priya SS. Comparison between intermittent epidural bolus of levobupivacaine 0.125% and ropivacaine 0.2% with fentanyl as adjuvant for combined spinal epidural technique in labor analgesia: A double blinded prospective study. *Ann Afr Med.* 2023; 22(1):88-93. doi: 10.4103/aam.aam_249_21. PMID: 36695228; PMCID: PMC10064902.
- 7 Narra GR, Manohar S, Supriya P, Himani A, Mounica M. A Randomized Comparison of 0.125% Levobupivacaine, 0.125% Ropivacaine and 0.125%Bupivacaine Combined with 2µG/ML Fentanyl for Epidural Labor Analgesia. *Journal of Evolution of Medical and Dental Sciences* 2015; 4: 7950-7959.
- 8 Grant EN, Tao W, Craig M, McIntire D, Leveno K. Neuraxial analgesia effects on labour progression: facts, fallacies, uncertainties and the future. *BJOG.* 2015; 122(3):288-93. doi: 10.1111/1471-0528.12966. Epub 2014 Aug 4. PMID: 25088476; PMCID: PMC4308552.
- 9 Capogna G, Celleno D, Lyons G, Columb M, Fusco P. Minimum local analgesic concentration of extradural bupivacaine increases with progression of labour. *Br J Anaesth.* 1998; 80(1):11-3. doi: 10.1093/bja/80.1.11. PMID: 9505770.
- 10 Sharmin S, Kamal MM, Rahman MM, Moinuddin M, Rahman MS, Akhtaruzzaman AKM. Effect of Epidural Bolus Levobupivacaine and Lignocaine in Late Second Stage of Parturition in Combined Spinal Epidural Labor Analgesia. *Bangladesh J. Pain.* 2022; 2(1):26-32. Doi: 10.62848/bjpain.v2i1.4025.

- 11 Aragão FF, Aragão PW, Martins CA, Leal KFCS, Ferraz Tobias A. Analgesia de parto no neuroeixo: uma revisão da literatura [Neuraxial labor analgesia: a literature review]. *Braz J Anesthesiol.* 201; 69(3):291-298. doi: 10.1016/j.bjan.2018.12.001. Epub 2019 Feb 15. PMID: 30777350; PMCID: PMC9391899.
- 12 Mishra PK, Singh AK, Divedi P. Comparative study between levobupivacaine with clonidine and levobupivacaine with fentanyl in epidural labour analgesia in rural set up. *Int J Res Med Sci* 2017; 5(9):4087-92. doi: 10.18203/2320-6012.ijrms20173988
- 13 Kumar TS, Rani P, Hemanth Kumar VR, Samal S, Parthasarathy S, Ravishankar M. Quality of Labor Epidural Analgesia and Maternal Outcome With Levobupivacaine and Ropivacaine: A Double-Blinded Randomized Trial. *Anesth Essays Res.* 2017; 11(1):28-33. doi: 10.4103/0259-1162.194573. PMID: 28298752; PMCID: PMC5341640.
- 14 Rani P, Surya R, Sheeba AJ, Parthasarathy S, Vadlamudi Reddy HK, Sivashanmugam T. Equipotent dose of levobupivacaine reduce the incidence of instrumental vaginal delivery when compared to ropivacaine during epidural labour analgesia. *Sri Lankan Journal of Anaesthesiology* 2018; 26(2): 105-110. doi:10.4038/slja.v26i2.8309.
- 15 Kamal MM, Debnath K, Afroz S, Moinuddin M, Haque MS, Uddin MA, Khan MKU. Labour Epidural Analgesia on Maternal and Neonatal Outcome: A Retrospective Observational Study. *Bangladesh J. Pain.* 2021; 1(2): 29-33. doi:10.62848/bjpain.v1i2.1963
- 16 Hosagoudar P, Vimala KR, Bhaskar U, Redd VS, Krishna L. The effects of epidural analgesia in normal labor. *Indian J Clin Anaesth* 2018; 5(3):407-414
- 17 Neeraja M, Lakshmi KB. A Comparison of Spinal Anaesthesia with Levo-Bupivacaine and Hyperbaric Bupivacaine combined with Fentanyl in Elective Caesarean Section. *IOSR Journal of Dental and Medical Sciences* 2019; 18(6): 28-45