



Original Article

## Preliminary Experience of Maternal Request for Epidural Labour Analgesia and Outcome in a Nigerian Tertiary Hospital

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### ABSTRACT

**Introduction:** Maternal request is an indication for epidural labour analgesia (ELA), the gold standard for pain relief in labour, based on United Kingdom Obstetric guidelines. This study aimed to assess the outcome of our Institutional protocol of encouraging women in labour to request ELA. **Methodology:** This was a retrospective study conducted among 51 women who requested epidural analgesia at presentation in labour. The parturients that received ELA were categorized as the Epidural group and those that did not receive ELA as the Non-Epidural group. Each parturient was followed up from the time of request for ELA till discharge from the hospital. The variables measured were modes of delivery and neonatal outcomes using Apgar scores which were compared in the two groups. We also reviewed the reasons for not receiving ELA in the non-epidural group. **Results:** Over 2 years, only 51 (1.9%) women requested epidural labour analgesia out of the 2794 deliveries in the hospital. Of the 51, the proportion of 70.6% (36) mothers received ELA and 29.4% (15) did not. Twenty-nine mothers (80.6%) had spontaneous vertex delivery compared to 13 (86.7%) that had a caesarean delivery ( $p=0.195$ ) and 7 (19.4%) babies had neonatal admissions in the epidural group compared to 1 (6.7%) in the non-epidural group respectively ( $p=0.58$ ). In the non-epidural group, the reasons attributed for not giving ELA by the anaesthetists were busy duty hour 7 (46.7%), late request 4 (26.7%), unaffordable cost 2 (13.3%) and precipitous labour 2 (13.3%). **Conclusion:** Most of the patients that requested ELA received it with a good foeto-maternal outcome. However, busy duty hour was the major reason for not receiving ELA in those that requested but did not receive it.

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## INTRODUCTION

There are diverse methods of pain relief in labour which include pharmacological, comprising of parenteral injection, inhalational, and neuraxial block (spinal and epidural) and non-pharmacological- such as back massage, aromatherapy, acupuncture and transcutaneous electrical nerve stimulation.<sup>1,2</sup> Epidural analgesia (EA) represents the most effective method to relieve labour pain.<sup>3-5</sup> Epidural labour analgesia (ELA) is reported to provide complete pain relief in 95% of cases of women who have labour pain.<sup>6</sup> Irrespective of this analgesic efficacy, the request for epidural labour analgesia when a woman is in labour is still low in Nigeria. Studies have shown that epidural analgesia tends to provide better satisfaction with the delivery process than mothers that had a parenteral injection for obstetric pain relief.<sup>7</sup>

The benefits of ELA have been in the provision of superior pain relief during the first and second stages of labour, enhancement of patient's cooperation during labour and delivery, provision of anaesthesia for episiotomy or forceps delivery and extension of anaesthesia for caesarean delivery.<sup>8</sup> Bonouvrié et al.<sup>9</sup> found that epidural labour analgesia on request results in lesser operative delivery and EA-related maternal side effects than routine ELA.

Previous obstetric guidelines have suggested that in the absence of any contraindication, the maternal request should be a major medical indication for pain relief during labour.<sup>10,11,12</sup> Epidural analgesia should be acceptable and safe with little or no side effects for both mother and the baby. We have previously reported epidural labour analgesia and awareness creation and found that the use of video demonstrations for pregnant women increased their willingness to request epidural pain relief.<sup>2</sup> As a follow-up to this, we, therefore, aimed to evaluate our preliminary experience of maternal requests for ELA and outcomes in a low-resource setting.

The primary outcome was the proportion of women who requested and received ELA or who requested but did not receive ELA. The secondary outcome was to evaluate the effect of socio-obstetric factors on a mother's request for ELA; to identify the reasons why some parturients that requested ELA did not receive it; to assess the problems associated with the provision of ELA; to

determine the foeto-maternal complications and maternal satisfaction.

## METHODOLOGY

We conducted a retrospective study among 51 pregnant women in labour at term who requested epidural labour analgesia between February 2017 and January 2019. Institutional ethical approval was obtained as well as written informed consent from the eligible patients. A roll-up banner with the phone number to call for the epidural request is permanently and conspicuously displayed at the labour ward reception in addition to 24-hour obstetric anaesthesia coverage. A review was carried out by the attending anaesthetist after a request to ascertain the patient's fitness for ELA. Parturients' height in metres (m), weight in kilograms (kg), and body mass index (BMI) in kg/m<sup>2</sup> was measured on admission. Inclusion criteria: maternal request for ELA, term gestation, singleton pregnancy and American Society of Anesthesiologists (ASA) physical status I or II. Exclusion criteria: multiple gestations, preterm labour, and contraindications to neuraxial block. Intravenous access with a 16- or 18-gauge cannula was established and intravenous fluid (Hartmann's solution or normal saline) was administered as appropriate. Patients who requested ELA and received it were categorized into the Epidural group while those that requested ELA but did not receive it were into the non-epidural group. Patients in the non-epidural group were given 1g of intravenous paracetamol when it was apparent that they could not receive ELA. Oxygen saturation of the patient's pulse rate, non-invasive blood pressure and temperature as well as the foetal heart rate were measured and assessed by the labour ward nurses before the epidural technique.

The epidural block was instituted in a sitting position at either lumbar (L) space L2-3 or L3-4 level with Tuohy needle size 18- gauge under aseptic condition and confirmed by loss of air resistance and successful catheter placement using 2 mL of lidocaine with adrenaline. Five millilitres of 0.125mg concentration of bupivacaine was injected every 5 minutes from a 20 mL syringe through the epidural catheter into the epidural space. The patient was instructed to lie in a lateral decubitus position to prevent aortocaval compression. A top-up dose of 10 mL of the same concentration was administered on

demand by the patient and vital signs of the mother and foetal heart rate were monitored regularly till after delivery. Our goal was to provide segmental sensory anaesthesia of the thoracic (T) space T10-L1 dermatomes during the first stage of labour.<sup>8</sup> The problems associated with the institution of ELA such as accidental dural puncture, partial block, leakage of epidural catheter, delayed top-up, neck stiffness, back pain and accidental detachment of filter from the epidural catheter at delivery were recorded. The maternal outcome was observed using the mode of delivery such as spontaneous vertex, caesarean and instrumental delivery) in both Groups. A delayed/late request is defined as cervical dilatation  $\geq 8$  cm and a too late request as cervical dilatation of 10 cm. A busy duty hour is defined as a period where approximately 1 in 4 parturients are delivered by caesarean section and the involvement of Anaesthetists in other anaesthetic care, during pregnancy or around the time of delivery<sup>13</sup>. Neonatal outcome in both groups was measured with the use of Apgar scores. We considered newborns for neonatal intensive care unit (NICU) admission when Apgar score  $\leq 7$  at 5 min.

The reasons for failure to receive ELA despite a request in the non-epidural group were observed and documented such as busy duty hours, unaffordable cost, unavailability of epidural materials and late request. The level of satisfaction with the labour analgesia received was also assessed using a 3-point scale (satisfied, not satisfied and undecided) in both groups. The time interval between ELA request and administration, ELA administration and delivery were documented. Each parturient was followed up from the time of request for ELA to delivery time and till discharged home.

All calculations and statistical analyses were performed using International Business Machine (IBM) and Statistical Package for the Social Sciences (SPSS) Statistics windows version 23.0 (SPSS Incorporated, Chicago, IL, USA). Descriptive statistics were used and reported as mean  $\pm$  standard deviation (SD) for continuous variables and analyzed using the two-sample t-test or analysis of variance (ANOVA) as appropriate. Categorical data are reported as numbers (proportion) or percentages and were analyzed by Fisher's exact test. Any p-value less than 0.05 was considered statistically significant.

## RESULTS

There were 2,794 total deliveries including 1,117 (40%) caesarean sections over two years out of which only 51 (1.8%) parturients requested ELA and only 36 (1.29%) received ELA. Of the 51 mothers, 36 (70.6%) parturients received ELA of the studied population did not receive ELA. The first source of information on ELA by the parturients was from an antenatal clinic in 35 (68.6%), books 6 (11.8%), relatives & friends 5 (9.8%), internet 3 (5.9%) and school 2 (3.8%).

Table 1: Demographic characteristics of patients in the epidural and non-epidural groups

Patients' characteristics	Epidural group	Non-epidural group	P value
Age (years)	29.67 $\pm$ 3.66	29.23 $\pm$ 3.49	0.72
Height (m)	1.64 $\pm$ 7.50	1.62 $\pm$ 4.60	0.362
Weight (kg)	78.89 $\pm$ 13.03	77.93 $\pm$ 17.3	0.657
BMI (kg/m <sup>2</sup> )	28.17 $\pm$ 4.32	29.86 $\pm$ 6.79	0.307

BMI =Body Mass Index

Table 2: Socio-demographic and obstetric characteristics of the epidural and non-epidural groups

Socio-demographic and obstetric characteristics	Epidural group n=36	Non-epidural group n=15	P value
	n (%)	n (%)	
Age (years)			
$\leq 35$	35 (97.2)	14 (93.3)	0.506
$\geq 36$	1 (2.8)	1 (6.7)	
Occupation			
Health worker	14 (38.9)	5 (33.3)	0.761
Non-Health worker	22 (61.1)	10 (66.7)	
Education			
Secondary	1 (2.8)	3 (20.0)	0.071
Postsecondary	35 (97.2)	12 (80.0)	
NHIS Registered			
Yes	35 (97.2)	13 (86.7)	0.203
No	1 (2.8)	2 (13.3)	
Parity			
Nulliparous	21 (58.3)	7 (46.7)	0.324
Multiparous	15 (41.7)	8 (53.3)	

NHIS (National Health Insurance Scheme)

One-third (33.3%) of the patients that requested ELA were health care providers (9

nurses, 4 doctors, 2 pharmacists and 2 others) out of which the highest proportion 14 (82.4%) received ELA. Demographic data were comparable between the two groups. (Table 1). Only 5 (13.9%) patients in the epidural group received ELA within one hour (21-60 min) of request. The time interval between the ELA request and the time they received it was from 21-1960 min. with a mean, (SD) value of 269.4 ± 350.8 min and the interval from the time of epidural set-up to delivery was 180-2760 min.

Comparison of age, occupation, level of education, NHIS (National Health Insurance Scheme) registration, parity and time of delivery between the two groups are shown in Table 2. The 11.5. Amongst the nulliparous women in the epidural group, 5 (23.8%) of the newborns had neonatal admissions against 0 (0.0%) neonates in the non-epidural group. Two (13.3%) of the newborns had neonatal admissions in the epidural group against 1 (6.7%) in the non-epidural group amongst the multiparous women.

Table 3: Reasons for not receiving ELA in the non-epidural group

Reasons	Frequency n=15	Percentage
Busy duty hour	7	46.7
Late request	4	26.7
Unaffordable cost	2	13.3
Precipitate labour	2	13.3

ELA (Epidural Labour Analgesia)

Table 4: Complications of ELA in the epidural group

Complications	Frequency n=36	Percentage
Accidental dural puncture	5	13.9
Partial block	3	8.3
Neck stiffness	1	2.8
Back pain	1	2.8
Leakage of catheter	1	2.8
Delayed top-up	1	2.8
Accidental detachment of filter from epidural catheter at delivery	1	2.8
No complication	23	63.9

Data are number (%), ELA (Epidural Labour Analgesia)

Overall maternal and neonatal outcomes are shown in Table 5. Twenty-one (58.3%) including a mother with intrauterine foetal death (IUFD) and one

(6.7%) mother were satisfied with pain relief in the epidural and non-epidural respectively (p=0.001). However, 5 (13.9%) mothers were not satisfied among the epidural group when compared to 10 (66.7%) in the non-epidural group. (p=0.015). Parturients that were undecided about their pain relief level of satisfaction with the pain relief received were 10 (27.8%) and 4 (26.7%) in epidural and non-epidural groups respectively.

Table 5: Comparison of maternal and neonatal outcomes in both the epidural and non-epidural groups

Patient's outcome	Epidural group n=36	Non-epidural group n=15	P-value
Maternal outcome			
SVD	29 (80.6)	13 (86.7)	1.00
Instrumental delivery	1 (2.8)	0 (0)	
Emergency CD	6 (16.6)	2 (13.3)	
Neonatal outcome			
No admission	28 (77.8)	14 (93.3)	0.582
Admission into neonatal ICU	7 (19.4)	1 (6.7)	
Intra-uterine fetal death	1 (2.8)	0(0)	
Maternal level of satisfaction			
Satisfied	21 (58.3)	1 (6.7)	*0.001
Not satisfied	5 (13.9)	10 (66.7)	
Undecided	10 (27.8)	4 (26.6)	

ICU (Intensive Care Unit), CD (Caesarean Delivery), SVD (Spontaneous Vertex Delivery), \*Statistically significant

## DISCUSSION

The rate of epidural labour analgesia (ELA) requests in this study was low (1.8%) which is similar to 1.29% in another Nigerian study<sup>14</sup>. A slightly higher figure of 2.2% was recorded in an annual report by a South African Hospital<sup>15</sup>. The close similarities in the three African studies may be due to a lack of awareness, illiteracy, cost of epidural materials, shortage of manpower and fear of ELA complications. This is contrary to the 32% reported in the Australian population.<sup>16</sup> Nguyen et al.<sup>17</sup> reported the factors associated with receipt of ELA to include nulliparity (62.3%), health insurance cover (75.8%) and high school education exposure (69.1%). In comparison to their study, our study showed higher proportions of 97.2% on the level of education in the epidural group than the non-epidural with no significant

statistical difference. Higher formal education and enrolment in the health insurance scheme could have afforded the patients more knowledge about ELA which might have influenced their higher levels of subscription.<sup>2</sup> Reduction of out-of-pocket payments for patients on the health insurance scheme could be a major factor in favour of ELA receipt.

A prospective study conducted in Australia assessed the source of information about ELA among 102 respondents<sup>18</sup>. Friends and relatives accounted for 36%, antenatal visits 25% and general multimedia for 17%. We, noted, however, that majority (68.6%) of the parturients in our study first got information about ELA during health education at the antenatal clinic. This is contrary to findings in Saudi Arabia that revealed relatives and friends accounted for 58.1% and 42% in two separate studies.<sup>4,19</sup> Alkeely and colleagues in their cross-sectional study amongst the primigravida found that health education on epidural analgesia is an important factor in increasing women's desire and better decision-making to request the use of ELA.<sup>4</sup> Although those pregnant women in their study were not followed up during the intrapartum period to know if they eventually requested epidurals or not. Therefore, it is imperative to educate pregnant women on ELA as a standard pain relief method during antenatal care services to increase awareness with the intention of the increasing rate of its request. The maternal request may be associated with the educational level of mothers. In the index study, the majority 92.2% of patients who requested ELA had post-secondary education which is higher than 69.4% of women with higher educational status in a study by Ojiakor et al.<sup>14</sup> in same Southern Nigeria. Nevertheless, all the women that voluntarily requested ELA received it unlike ours.

Epidural labour analgesia should be promptly given on request except where there are contraindications.<sup>20,21,22</sup> This is contrary to the findings in our study where some who requested ELA did not receive it. In this study, ELA requested at cervical dilatation of equal to or greater than 8 cm was regarded as a late request taking into consideration the time for preparation for the procedure as well as the onset of action of the local anaesthetic agent. More mothers would have probably benefited from ELA if the request had been made earlier for adequate preparation for the procedure. Notwithstanding, the late request should not be a barrier to ELA in better obstetric care services. Sub-optimal epidural services in

low-resource countries like ours may result in inadequate labour analgesia to the parturients. No doubt, the dexterity of anaesthetists in the prompt and correct placement of the epidural catheter in this regard would also be beneficial in the future management of labour pain using ELA in our institution. We found that majority (54.9%) of those that requested ELA were nulliparous women out of which 58.6% of them were able to receive it. Previous studies in Netherlands and Australia have reported that nulliparous mothers were more likely to request ELA.<sup>23,24</sup> The authors noted that nulliparity is one of the most useful predictors of mothers who may have more intense pain during labour and delivery. However, the request should not be too close to delivery because there is a need to make sure the anaesthesiologist is available and have at least 30 minutes for it to be administered and take effect.<sup>25</sup> In our study, only 13.9% of those that received ELA got it within one hour of request. The fact that the majority of parturients that received ELA outside this golden hour is contrary to the Obstetric Anaesthetists' Association and Anaesthetists' Association of Great Britain & Ireland (OAA/AAGBI) guidelines<sup>12</sup> on basic minimum recommendations on 24-hr epidural services. The highest time interval between a maternal request for ELA and epidural administration in the index study was 1960 min. This is different from a shorter 187 min reported in a grand-grand multiparous study by Loscovich and Colleagues.<sup>26</sup> Nonetheless, the time of ELA request by the mothers after hospital admission is not clear in their study. The long hours between epidural request, the institution of ELA and delivery time which is a cause of concern may probably be due to prolonged labour commonly associated with nulliparous women who were more in number than the multiparous in our study. Another study that compared the time of maternal request for ELA to the arrival of an anaesthetist was a range of 1-230 min and 0-120 min for public and private patients respectively.<sup>27</sup> Furthermore, in their study, 90% of women who had requested ELA received it. However, the anaesthetist was contacted for six patients but did not show up and for 27 women the anaesthetist arrived, but no ELA was given without any documented reason. The authors eventually proposed fruitful areas of research into these.

In this study, busy duty hour is responsible for the majority (46.7%) of those that did not receive ELA. According to Obstetric services, as published by OAA in 2013, the

definition of a busy unit is deliveries  $\geq 5,000$  per year an epidural rate of  $\geq 35\%$  and a caesarean delivery rate greater than 25%<sup>12</sup>. Moreover, in our study, the average number of deliveries per year was 1390 and 1.8% of epidural rate which is far below the number recommended by OAA. However, the caesarean section rate of 40% in our centre makes it a busy unit. Singh et al.<sup>28</sup> their study found that patient-controlled epidural analgesia (PCEA) with basal continuous infusion may be preferred in a busy obstetric unit with increased demand for epidural analgesia. This may be a future in a low-resource setting like ours where the facility for PCEA is not readily available and cost-effective.

While there are pieces of evidence that administering ELA to parturients on request at any time before delivery may be beneficial, the challenge is that there may not be enough time for the analgesia to take effect in those close to full cervical dilatation because of the severity of pain and risk of movement during the placement of catheter with antecedent more serious consequences.<sup>29</sup>

The unaffordable cost of epidural materials was the reason why two mothers that requested ELA did not receive it. Concerning this, the cost of epidural materials should be subsidized or incorporated into National Health Insurance Scheme (NHIS) so that more parturients can benefit from ELA. In a cost analysis of ELA and intravenous analgesia by Macario et al.<sup>30</sup> it was found that mothers in the epidural group spent more money than those in the non-epidural group. This is consistent with the study done in a Vietnam Hospital that showed that mothers (48.1%) who did not receive epidural analgesia had more epidural-related concerns about the cost of epidural when compared to 8.7% in the epidural group.<sup>16</sup>

Accidental dural puncture (ADP) was the most common (13.8%) associated problem of epidural analgesia in our study. In contrast, the estimated incidence of ADP was 1% in Nordic countries.<sup>31</sup> We believed that the higher incidence of ADP may be associated with the preliminary status of ELA in our centre with emerging experience. On current evidence, Nakadate and Colleagues concluded in their study that anaesthetic experience did not affect the incidence of ADP.<sup>32</sup> They believed that daily individual training is needed to reduce the incidence of ADP. Also, accidental epidural catheter removal can occur during a patient's transport within the labour

ward and the delivery room as it was in one patient in our study. Myatra and colleagues reported a 1.1% incidence of accidental epidural catheter removal amongst all other accidental catheter removals in patients admitted into an intensive care unit.<sup>33</sup> It is therefore important to secure the epidural catheter to the back of the patient very well to prevent inadvertent removal and denial of the patient from benefiting from ELA or any other epidural pain relief.

It is often said that instrumental vaginal or caesarean delivery rate does increase when ELA is used, although with conflicting reports in various studies. Notwithstanding, Agrawal et al.<sup>34</sup> found that instrumental delivery did not increase in the epidural group. In another study, women with epidural analgesia had a significantly higher instrumental delivery (37.9% versus 16.4%) and caesarean delivery rate (26% versus 10.1%) than those without ELA respectively.<sup>35</sup> Our findings showed that 2.8% and 16.7% of the parturients in the epidural group compared with 0% and 13.5% in the non-epidural group had instrumental and Caesarean delivery respectively, although the difference is not statistically significant. This is different from 26.7% of operative delivery reported by Wassen et al.<sup>36</sup> amongst those that requested and received ELA, although not also statistically significant. Other factors that are indications for instrumental and abdominal deliveries not necessarily from problems of ELA may be due to different confounding factors which are relatively difficult to eliminate.

In a comparative study of ELA and natural delivery without analgesia amongst primiparas by Luo and co-researchers,<sup>37</sup> neonatal admissions of 4.11% versus 2.7% respectively were observed. This was similar to the higher rate of neonatal admission in the ELA group (19.4%) compared to non-epidural (6.7%) in our study, although there was no statistically significant difference between the two studies. Contrary to these two studies, a Nigerian study reported no case of neonatal admissions in their groups.<sup>7</sup> Apart from pain relief in labour, the other factors that may be responsible for the neonatal outcome are multifactorial which include parity, age of the mother, duration of labour and delivery, baby weight and other perinatal problems which were not fully explored in the index study.

A study on ELA has excluded mothers with intrauterine fetal death.<sup>38</sup> A mother's request in such a situation should not be denied except if there is a contraindication such as clotting

disorders. Interestingly, a case of a mother with intra-uterine fetal death in our study was offered ELA on request with maternal satisfaction in terms of analgesia received. Measurement of the level of satisfaction in a mother is multifactorial<sup>27</sup>. Safe delivery in both the mother and the newborn being alive may be enough for a good satisfactory outcome for the majority. Although, our study was not designed to evaluate labour pain severity, but did assess the level of satisfaction based on analgesic efficacy in the two groups. We, therefore, found a statistically significant difference in the overall level of satisfaction with the analgesia received by the epidural group (58.3%) when compared with the non-epidural group (6.7%) in the overall level of satisfaction. Fyneyface-Ogan et al.<sup>7</sup> found a similar higher level of satisfaction 88% in the epidural group compared to 4% in the non-epidural group.

There are several limitations in this index study. It is subject to selection and reporting bias as parturients without ELA were not excluded and their inability to receive ELA was not intentional. A retrospective study is often associated with missing data which would have added value to the results and discussion. The small sample size as recorded in this study is another major limitation. A larger population would have given a clearer picture of ELA problems in those that received it and a more definitive reason for those that requested but did not receive it. Our limitation also included the inability to assess pain measurement because of a shortage of manpower for busy obstetric care in a low-resource setting which also made administration of rescue analgesia impossible for those that might have had moderate to severe labour pain. Further research will be necessary for a larger population to determine the challenges facing ELA maternal requests and longer time follow-up for more robust results.

In conclusion, the rate of ELA requests is unacceptably low, although most of the parturients that requested ELA received it with good maternal and neonatal outcomes. However, there were recognized barriers to not receiving it out of which busy duty hours and late requests at the obstetric care services were the major concerns. There will be a need for more staff in the obstetric unit such as anaesthetists, obstetricians, midwives and support staff. Empowerment of obstetric anaesthetic unit with the much-needed skills and facilities in rendering epidural services to parturients will increase ELA provision and reduce associated problems with it. Health care providers especially midwives and obstetric teams in general also would need to counsel pregnant women from the time of booking on the importance of ELA to increase their request for it.

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REFERENCES

- Thomson G, Feeley C, Moran VH, Downe S, Oladapo OT. Women's experiences of pharmacological and non-pharmacological pain relief methods for labor and childbirth: A qualitative systematic review. *Reprod Health* 2019;16:71. Doi: [10.1186/s12978-019-0735-4](https://doi.org/10.1186/s12978-019-0735-4)
- Olateju SO, Adetoye AO, Ijarotimi OA, Olowookere SA, Aaron OI, Oyebo PA, et al. Impact of video demonstration on willingness of pregnant women to receive epidural labor analgesia in a Nigerian hospital-An open label trial. *Journal of Obstetric Anaesthesia and Critical Care* 2019; 10(1): 26-31
- Koyyalamudi V, Sidhu G, Cornett EM, [Nguyen V, Labrie-Brown C, Fox CJ](#), et al. New labor pain treatment options. *Curr Pain Headache Rep* 2016; 20:11doi: 10.1007/s11916-016-0543-2.
- [Alakeely MH, Almutari A, Alhekail GA](#), Abuoliat ZA, Althubaiti A, Aboltai LA, et al. The effect of epidural education on primigravida women's decision to request epidural analgesia: a cross-sectional study. *BMC Pregnancy and Childbirth* 2018; 18:124. <https://doi.org/10.1186/s12884-018-1766>.
- Ashagrie HE, Fentie DY, Kassahun HG. A review article on epidural analgesia for labor pain management: A systematic review. *Int J Surg Open* 24 (2020) 100e104. <https://doi.org/10.1016/j.ijso.2020.04.007>
- Tidy C. Pain relief in labour. [patient.info/doctor/pain-relief-in-labour](http://patient.info/doctor/pain-relief-in-labour). Last edited 2 Jan 2015. Accessed on 21 April, 2022.
- Fyneface-Ogan S, Mato CN, Anya SE. Epidural anesthesia: views and outcomes of women in labour in a Nigerian hospital. *Ann Afr Med* 2009; 8:250–56.
- Vincent RD, Chestnut DH. Epidural Labour Analgesia. *Am Fam Physician* 1998;58(8):1785-92.
- [Bonouvié K, Bosch AV, Roumen FJME](#), van Kuijk SM, Nijhuis JG, Evers SMAA, et al. Epidural analgesia during labour, routinely or on request: a cost-effectiveness analysis. *Eur J Obstet Gynaec Reprod Biol* 2016. 207; 23-31.
- National Collaborating Centre for Women's and Children's Health: Induction of labour. NICE Clinical Guideline 70, Royal College of Obstetricians and Gynaecologists (RCOG) Press 2008, pp 72–5.
- The American College of Obstetricians and Gynaecologists. *Obstetric Analgesia and Anaesthesia. Practice bulletin* 2019. <https://www.acog.org/clinical/clinical-guidance/practice-bulletin/articles/2019/03/obstetric-analgesia-and-anesthesia>. Accessed on 16 November, 2022
- OAA/AAGBI Guidelines for Obstetric Anaesthetic Services 2013. [https://anaesthetists.org/Portals/0/PDFs/Guidelines%20PDFs/Guideline%20obstetric%20anaesthetic%20services%2013\\_final.pdf?ver=2018-07-11-163755-693&ver=2018-07-11-163755-693](https://anaesthetists.org/Portals/0/PDFs/Guidelines%20PDFs/Guideline%20obstetric%20anaesthetic%20services%2013_final.pdf?ver=2018-07-11-163755-693&ver=2018-07-11-163755-693). Accessed on 17 November, 2022.
- Hospital Episode Statistics: NHS Maternity Statistics – England 2013–2014. *HSCIC*, 2015 ([bit.ly/2o6YC4q](http://bit.ly/2o6YC4q)). Accessed on 17 November, 2022.
- Ojiakor SC, Obidike AB, Okeke KN, Nnamani CP, Obi-Nwos AJ, Egeomu RO. Factors associated with demand for epidural analgesia among women in labour at a tertiary hospital in Nnewi, South-East, Nigeria. *Magna Scientia Advanced Research and Reviews*; 2021. DOI:10.30574/MSARR.2021.2.1.
- Annual reports 2012-2015 for the Department of Obstetrics and Gynaecology, Tygerberg Hospital, Western Cape, South Africa, Compiled by Prof GB Theron. (Unpublished data).
- Australian Government Web Report-Australian Institute of Health and welfare. Australia's mothers and babies. 15 Dec 2021.<https://www.aihw.gov.au/reports/mothers-babies/australias-mothers-babies-data-visualisations/contents/labour-and-birth/analgesia>. Accessed 29 March, 2022.
- Nguyen LD, Nguyen AD, Farber MK, Phan CT, Khuat LT, Nguyen HT, et al. [Sociodemographic factors associated with request for labor epidural analgesia in a tertiary obstetric hospital in Vietnam](#). *Biomed Res Int* 2021;(1):1-5.
- Mahomed K, Chin D, Drew A. Epidural analgesia during labour – maternal understanding and experience – informed consent. *J Obstet Gynaecol* 2015; 35(8):807-09.
- Mohamed HF, Alqahtani J, Almobaya N, Aldosary M, Alnajay H. Women's Awareness and Attitude towards Epidural Analgesia. *Journal of Biology, Agriculture and Healthcare*. 3(6); 2013. <https://www.iiste.org/Journals/index.php/JBAH/article/view/5680/5793>.
- Seaman AM. Women can request epidural anytime during labor: analysis. *Reuters Health*. [bit.ly/MvDtGO](http://bit.ly/MvDtGO) The Cochrane Library, online October 9, 2014. <https://www.reuters.com/article/us-health-labor-idUSKCN0HX21620141008>.
- Lyndon A, Lee HC, Gay C, et al. Effect of time of birth on maternal morbidity during childbirth hospitalization in California. *Am J Obstet Gynecol* 2015;213(5):705.e1-705.e11.
- Sng BL, Leong WL, Zeng Y, Siddiqui FJ, Assam PN, Lim Y. Early versus late initiation of epidural analgesia for labour. *Cochrane Database Syst Rev* 2014. 9(10):CD007238. Doi: 10.1002/14651858.CD007238.pub2.
- [Wassen MMLH, Hukkelhoven CWPM, Scheepers HCJ](#), Smits LJM, Nijhuis JG, Roumen FJME. Epidural analgesia and operative delivery: a ten-year population-based cohort study in the Netherlands. *Eur J Obstet Gynecol Reprod Biol* 2014;183:125-31.
- Quach D, Woolley T, Pandit T, Rane A, Ray RA. Women's epidural decision-making in labour: A Townsville perspective. *Australian and New Zealand Journal of Obstetrics and Gynaecology* 2020. Doi:10.1111/ajo.13199.
- WALNUT HILL Obstetrics & Gynecology. Epidurals: Need it or Leave it? <https://walnuthillobgyn.com/blog/epidurals-need-it-or-leave-it/>. Accessed 25<sup>th</sup> March, 2022.
- Loscovich A, Fadeev A, Rivilis A, Elstein D. Requests and usage of epidural analgesia in grand-grand multiparous and similar age women with lesser parity: Prospective observational study. *J Perinat Med* 2011; 39 (6): 697-700.
- Barker HM, Simmons SW, Hiscock RJ, Cyna AM, Mcdonald S. Time to get comfortable with a labour epidural. *Anaesth Intensive Care* 2014; 42 (1): 73-7.
- Singh S, Singh A, Srivastava U. Low Dose Epidural Analgesia During Labor: Comparison Between Patient



- Controlled Epidural Analgesia with Basal Continuous Infusion and Intermittent Bolus Technique. *J Obstet Gynaecol* 2011; 61(4): 404–07.
29. Erickson H. When is it too late to get an epidural: Can I get an epidural at 7 centimeters? *The Pregnant Nurse* 2021. September 17, 2021. <https://pregnurse.com/epidural-7-cm/>. Accessed 25 March, 2022.
  30. Macario A, Scibetta WC, Navarro J, Riley E. Analgesia for Labor Pain: A Cost Model. *Anesthesiology* 2000; 92(3): 841–50.
  31. [Darvish B](#), [Gupta A](#), [Alahuhta S](#), [Dahl V](#), [Helbo-Hansen S](#), [Thorsteinsson A](#), [Irestedt L](#), [Dahlgren G](#). Management of accidental dural puncture and post-dural puncture headache after labour: a Nordic survey. *Acta Anaesthesiol Scand* 2011;55(1):46-53.
  32. Nakadate Y, Nakajima E, Ikemoto K, Oguchi T, Matsukawa T. Anaesthetic experience does not reduce accidental dural puncture in surgical patients: a retrospective case -controlled study. *BMC Anesthesiol* 2022;22(1):139. Doi: 10.1186/s12871-022-01657-x
  33. Myatra, S, Divatia J, Mehta P, Kalaniya S, Sareen R. Accidental catheter removal in the intensive care unit: a prospective observational study. *Crit Care* 2005; 9: P258. <https://doi.org/10.1186/cc3321>.
  34. Agrawal D, Makhija B, Arora M, Haritwal A, [Gurha P](#). The effect of epidural analgesia on labour, mode of delivery and neonatal outcome in nullipara of India, 2011-2014. *J Clin Diagn Res* 2014; 8 (10):OC03-6. Doi: 10.7860/JCDR/2014/9974.4930. Epub 2014 Oct 20.
  35. Antonakou A, Papoutsis D. "The Effect of Epidural Analgesia on the Delivery Outcome of Induced Labour: A Retrospective Case Series", *Obstetrics and Gynecology International*; Article ID 5740534, 5 pages, 2016. <https://doi.org/10.1155/2016/5740534>
  36. [Wassen MMLH](#), [Smits LJM](#), [Scheepers HCJ](#), Marcus MAE, Van Neer J, Nijhuis JG, et al. Routine labour epidural analgesia versus labour analgesia on request: a randomised non-inferiority trial. *BJOG* 2015;122(3):344-50.
  37. [Luo D](#), [Yuan Y](#), [Guo L](#), [Chen Z](#). A comparative study of epidural labor analgesia and natural delivery without analgesia. *Am J Transl Res* 2021; 13(6): 7015–21.
  38. Kearns RJ, Shaw M, Gromski PS, Iliodromiti S, Lawlor DA, Nelson SM. Association of Epidural Analgesia in Women in Labor With Neonatal and Childhood Outcomes in a Population Cohort. *JAMA Network Open*. 2021;4(10):e2131683. doi:10.1001/jamanetworkopen.2021.31683.