

KNOWLEDGE, PERCEPTION, AND UTILIZATION OF OBSTETRIC EPIDURAL ANESTHESIA FOR LABOUR PAIN MANAGEMENT: A RANDOMIZED CONTROLLED TRIAL AT UNIVERSITY OF CALABAR TEACHING HOSPITAL

E.C. Osuchukwu¹, F.U. Mandah², I.B. Standley², R. Ezekiel², P. Okpuruka²

1. Department of Nursing, College of Medical Sciences, University of Calabar, Calabar, Nigeria.
2. Department of Nursing, PAMO University of Medical Sciences, Port Harcourt, Nigeria

Correspondence:

Dr. E.C. Osuchukwu

Department of Nursing,
College of Medical Sciences,
University of Calabar,
Calabar, Nigeria
Email: easter.osuchukwu@yahoo.com

Submission Date: 11th Nov., 2024

Date of Acceptance: 24th July, 2025

Publication Date: 31st Aug., 2025

Copyright Statement

The copyright of this manuscript is vested in this journal and in its publisher, the Association of Resident Doctors, University College Hospital, Ibadan.

This article is licensed under the Creative Commons Attribution-Non Commercial License 3.0 (CC BY-NC 3.0).

ABSTRACT

Background: Obstetric epidural anesthesia is a widely used technique for managing labor pain, offering effective relief while allowing women to remain conscious during childbirth. Despite its benefits, utilization remains suboptimal, often hindered by knowledge gaps, misconceptions, and healthcare system barriers.

Objective: This study aimed to assess the knowledge, perception, and utilization of obstetric epidural anesthesia among pregnant women at the University of Calabar Teaching Hospital (UCTH).

Method: A parallel-group randomized controlled trial design was employed, targeting pregnant women aged 15 to 49 years. Participants were randomly assigned to an intervention group, receiving obstetric epidural anesthesia during labour, or a control group, following standard pain management protocols. Simple random sampling selected participants, and data were collected via structured questionnaires administered at baseline, post-intervention, and during postpartum follow-up, along with clinical assessments.

Results: Awareness of obstetric epidural anesthesia was high, with 97.6% of intervention group participants and 95.2% of control group participants informed about it. Positive perceptions of its effectiveness for labour pain relief were notably higher in the intervention group (48.8%) compared to the control group (27.7%). Utilization rates were also high, with 81.7% of the intervention group and 85.5% of the control group reporting prior use.

Conclusion: This randomized trial demonstrated that targeted antenatal education significantly improved women's knowledge and perception of epidural anesthesia and promoted its informed utilization. These findings support integrating pain management education into routine antenatal care in Nigeria. These results underscore the need for comprehensive education and counseling strategies to empower pregnant women in making informed decisions about pain management during childbirth, ultimately enhancing their birth experience and satisfaction. The findings highlight the importance of education and counseling in enhancing knowledge, perception, and utilization of obstetric epidural anesthesia among pregnant women. Integrating targeted awareness strategies into antenatal care is essential for addressing misconceptions and optimizing labour pain management, ultimately improving maternal health outcomes.

Keywords: Obstetric epidural anesthesia, Labour pain management, Knowledge, Perception, Utilization

INTRODUCTION

Obstetric epidural anesthesia is a widely recognized and effective method for managing labour pain, involving the injection of local anesthetics and opioids into the epidural space surrounding the spinal cord.¹ This technique not only provides substantial relief from labor pain but also plays a critical role in managing pregnancy-related complications, such as preeclampsia, and in preventing severe hemorrhages during childbirth.^{1,2} Despite its proven efficacy, the utilization of epidural anesthesia remains limited, particularly in resource-constrained settings like Nigeria, where various barriers inhibit its widespread adoption. Several

factors contribute to the underutilization of obstetric epidural anesthesia in these regions. Scarcity of resources, including a lack of access to trained healthcare providers, poses significant challenges. Furthermore, inadequate training and education among practitioners can lead to misconceptions about the procedure, further deterring its use.³ Research has demonstrated that informed decision-making is crucial for enhancing the childbirth experience; women who possess comprehensive knowledge about epidural anesthesia are more likely to view it favorably and actively engage in decisions regarding its

implementation. In contrast, ignorance or misinformation can exacerbate anxiety and resistance to opting for epidural anesthesia during labor.^{4,5}

Moreover, studies indicate that well-informed women often report higher satisfaction with their childbirth experiences, feeling empowered and in control throughout the process.³ Despite this, the decision to utilize or forgo epidural anesthesia during labor can vary significantly among women. Many choose to pursue this intervention due to its effectiveness in alleviating pain and enhancing comfort during labor. However, others may reject it in favor of a more natural childbirth experience, often driven by concerns over potential side effects, costs, and cultural beliefs regarding childbirth practices.^{6,7} The multifaceted challenges associated with the adoption of obstetric epidural anesthesia are particularly pronounced in low-resource settings like Nigeria, where financial constraints and a shortage of trained practitioners further limit access.^{3,8} Addressing these barriers through targeted education, resource allocation, and policy changes is essential for improving the accessibility and utilization of this vital pain management technique, ultimately enhancing maternal and neonatal outcomes in these regions.⁹

MATERIALS AND METHOD

Study design

This study employs a parallel-group randomized controlled trial (RCT) methodology to rigorously evaluate the effectiveness and safety of obstetric epidural anesthesia in managing labor pain among pregnant women aged 15 to 49 years attending the University of Calabar Teaching Hospital (UCTH) in Calabar, Cross River State. The RCT design is appropriate for minimizing bias and establishing causal relationships between the intervention and outcomes, making it a robust approach to assessing the impact of epidural anesthesia on labor pain management.

Study setting

The research was conducted at UCTH, a tertiary healthcare facility in Calabar, serving as a clinical training site for medical students and healthcare professionals. The hospital houses various departments, including obstetrics and gynecology, and provides comprehensive medical services to a diverse patient population. This unique setting makes UCTH an ideal location for studying the knowledge, perception, and utilization of obstetric epidural anesthesia among pregnant women. The target population consists of pregnant women aged 15 to 49 years attending the Antenatal Clinic at UCTH. The accessible population includes those who meet the inclusion criteria and are present at the clinic during the recruitment phase.

Inclusion criteria:

- Pregnant women aged 15 to 49 years attending the Antenatal Clinic at UCTH.
- Mentally stable individuals capable of providing informed consent.
- Women at any stage of pregnancy who are willing to receive obstetric care at UCTH.

Exclusion criteria:

- Pregnant women with contraindications to epidural anesthesia, such as coagulopathy, severe hypovolemia, or infection at the injection site.
- Women with a history of adverse reactions to epidural anesthesia.
- Patients with significant medical conditions necessitating urgent or emergent interventions.

Randomization

Participants were randomly assigned to either the intervention group or the control group using a computer-generated randomization sequence. This approach ensures unbiased allocation of participants to the study groups, enhancing the validity of the trial.

Intervention

Participants in the intervention group received obstetric epidural anesthesia during labor. Prior to the administration of anesthesia, these participants were provided with comprehensive education regarding the procedure, including its mechanism of action, benefits, potential risks, and management of side effects. Additionally, they received training in relaxation techniques and breathing exercises designed to optimize the effectiveness of the anesthesia.

In contrast, the control group underwent standard pain management protocols, which comprised non-pharmacological methods (such as massage and heat application) and systemic analgesics (e.g., intravenous opioids).

Blinding

Due to the nature of the educational intervention, blinding of participants was not feasible. However, outcome assessors, data analysts, and healthcare providers not involved in delivering the educational sessions were blinded to group assignments to minimize potential bias in outcome evaluation.

Outcome measures:

- **Primary outcome measures:** Changes in knowledge and understanding of obstetric epidural anesthesia, assessed using a structured questionnaire administered at baseline and post-intervention.
- **Secondary outcome measures:**
 - o Perception and utilization of epidural anesthesia.

- o Maternal satisfaction with pain relief, measured through post-delivery surveys.
- o Any adverse events related to the use of epidural anesthesia or the educational intervention, recorded during follow-up visits.

Data Collection

Data collection involved administering structured questionnaires at three key points: baseline (prior to the intervention), immediately post-intervention, and during follow-up visits postpartum. Clinical assessments were conducted during labor to evaluate the effectiveness of the epidural anesthesia or standard pain management protocols. Additionally, medical records were reviewed to gather information on delivery outcomes, neonatal outcomes, and any adverse events related to anesthesia.

Trained research staff ensured standardized data collection procedures, maintaining consistency and reliability across all study assessments. Descriptive statistics were employed to summarize baseline characteristics and outcome measures, each knowledge question was scored as 1 for correct and 0 for incorrect or 'don't know.' The sum of all 6 items gave a total knowledge score ranging from 0 to 6. Scores were classified as: good knowledge (5–6), moderate knowledge (3–4), and poor knowledge (0–2).

Perception items were scored as 1 for positive perception and 0 for negative/neutral, with total scores ranging from 0 to 6. Perception was classified as positive (4–6), neutral (2–3), and negative (0–1). Chi-square tests were used to determine differences in distribution between groups.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of UCTH and the Cross River State Ministry of Health, with registration number ETH/RCT/009/281. Informed consent was obtained from all participants, emphasizing their right to withdraw from the study at any time without penalty. Participants were assured of the confidentiality of their information, which was securely stored and handled in compliance with relevant data protection regulations.

RESULTS

A total of 165 participants were randomized (intervention group: n = 82; control group: n = 83). All completed baseline and post-intervention assessments. Table 1 presents the sociodemographic characteristics.

The table provides an overview of the distribution of respondents across various demographic characteristics, comparing the intervention and control

Table 1: Sociodemographic data

Variable	Category	Intervention Group (n = 82)	Control Group (n = 83)
Age	15 – 19 years	6 (7.3%)	0 (0.0%)
	20 – 29 years	51 (62.2%)	67 (80.7%)
	30 – 39 years	67 (81.7%)	63 (75.9%)
	40 years & above	41 (50.0%)	23 (27.7%)
Marital status	Single	3 (3.7%)	0 (0.0%)
	Married	138 (90.8%)	129 (100.0%)
	Divorced	1 (1.2%)	0 (0.0%)
	Widowed	1 (1.2%)	1 (1.2%)
	Separated	22 (26.8%)	0 (0.0%)
No of children	1 – 2	78 (95.1%)	71 (85.5%)
	3 – 4	63 (76.8%)	58 (69.9%)
	5 – 6	17 (20.7%)	17 (20.5%)
	7 & above	7 (8.5%)	4 (4.8%)
Level of education	No formal education	2 (2.4%)	0 (0.0%)
	Primary	13 (15.9%)	7 (8.4%)
	Secondary	93 (56.7%)	87 (100.0%)
	Tertiary	57 (69.5%)	58 (69.9%)
Occupation	Employed	41 (50.0%)	23 (27.7%)
	Unemployed	60 (73.2%)	71 (85.5%)
	Self-employed	64 (78.0%)	67 (80.7%)
Religion	Christianity	153 (92.7%)	154 (100.0%)
	Islam	4 (4.9%)	4 (3.9%)
	African traditional	8 (9.8%)	8 (9.8%)
	Atheist	0 (0.0%)	0 (0.0%)

Table 2: Knowledge of obstetric epidural anesthesia

Variables	Intervention Group (n = 82)	Control Group (n = 83)
Have you heard about obstetric epidural anesthesia?	80 (97.6%)	79 (95.2%)
Obstetric epidural anesthesia can be administered by any healthcare provider in the hospital?	70 (85.4%)	62 (74.7%)
Anesthesiologist is a person trained to give epidural anesthesia	60 (73.2%)	49 (59.0%)
Obstetric epidural anesthesia offers effective pain relief during labor?	65 (79.3%)	67 (80.7%)
Is there any risk associated with the use of obstetric epidural anesthesia?	50 (61.0%)	37 (44.6%)
Use of obstetric epidural anesthesia can lead to loss of bladder control	45 (54.9%)	35 (42.2%)

groups. In terms of age, the majority of participants in both groups were in the 20 – 39 years range, with 62.2% and 80.7% in the intervention and control groups, respectively. The intervention group had a higher percentage of participants in the older age categories (30 – 39 years and 40 years & above) compared to the control group. Regarding marital status, the majority were married in both groups, with 90.8% and 100% in the intervention and control groups, respectively. However, the intervention group

participants in the intervention group were employed (50.0%) compared to the control group (27.7%). Finally, concerning religion, the majority identified as Christians in both groups, with 92.7% and 100% in the intervention and control groups, respectively.

In the intervention group, majority of the participants demonstrated awareness regarding obstetric epidural anesthesia compared to the control group. Specifically, 97.6% of participants in the intervention group had

Table 3: Perception of obstetric epidural anesthesia

Items	Intervention Group (n = 82)	Control Group (n = 83)
Epidural anesthesia is an effective method of pain relief during labor	40 (48.8%)	23 (27.7%)
I believe epidural anesthesia can improve my overall birth experience	20 (24.4%)	2 (2.4%)
I am concerned about the potential side effects of epidural anesthesia	35 (42.7%)	25 (30.1%)
I trust the expertise of healthcare providers administering epidurals	30 (36.6%)	8 (9.6%)
I feel well-informed about the benefits of epidural anesthesia	25 (30.5%)	28 (33.7%)
I prefer natural methods of pain relief over epidural anesthesia	45 (54.9%)	27 (32.5%)

had a higher proportion of participants who were separated (26.8%) compared to the control group (0%). In terms of education level, the majority had at least a secondary education in both groups, with 56.7% and 100% in the intervention and control groups, respectively. Occupation-wise, a higher percentage of

heard about it, whereas 95.2% of participants in the control group were aware of it. Similarly, a higher percentage of participants in the intervention group believed that obstetric epidural anesthesia could be administered by any healthcare provider in the hospital (85.4%) compared to the control group (74.7%).

Table 4: Utilization of epidural anesthesia

Variables	Intervention Group (n = 82)	Control Group (n = 83)
In your previous pregnancy, did you use obstetric epidural anesthesia for pain relief during labor?	67 (81.7%)	71 (85.5%)
If yes, were you satisfied with the use of obstetric epidural anesthesia for labor pain relief?	67 (81.7%)	-
Will you recommend obstetric epidural anesthesia for other pregnant women?	67 (81.7%)	-

Table 5: Presents the distribution of overall knowledge and perception levels after categorizing respondents' scores

Category	Intervention n (%)	Control n (%)	χ^2 / p-value
Knowledge			
Good	55 (67.1%)	39 (47.0%)	7.12 / 0.008*
Moderate	20 (24.4%)	28 (33.7%)	
Poor	7 (8.5%)	16 (19.3%)	
Perception			
Positive	50 (61.0%)	28 (33.7%)	11.34 / 0.001**
Neutral	20 (24.4%)	30 (36.1%)	
Negative	12 (14.6%)	25 (30.1%)	

Moreover, a higher proportion of participants in the intervention group correctly identified anesthesiologists as persons trained to give epidural anesthesia (73.2%) compared to the control group (59.0%). Similarly, a greater percentage of participants in the intervention group believed that obstetric epidural anesthesia offers effective pain relief during labour (79.3%) compared to the control group (80.7%). Regarding the awareness of risks associated with obstetric epidural anesthesia, a higher percentage of participants in the intervention group (61.0%) recognized these risks compared to the control group (44.6%). Additionally, a larger proportion of participants in the intervention group acknowledged the potential side effect of loss of bladder control (54.9%) compared to the control group (42.2%).

In the intervention group, a higher percentage of participants expressed positive perceptions about epidural anesthesia compared to the control group. Specifically, 48.8% of participants in the intervention group believed that epidural anesthesia is an effective method of pain relief during labour, whereas only 27.7% of participants in the control group shared this belief. Similarly, a significantly larger proportion of participants in the intervention group (24.4%) believed that epidural anesthesia can improve their overall birth experience compared to the control group (2.4%). Additionally, a higher percentage of participants in the intervention group (42.7%) expressed concerns about the potential side effects of epidural anesthesia compared to the control group (30.1%).

Furthermore, a greater number of participants in the intervention group (36.6%) reported trusting the expertise of healthcare providers administering epidurals compared to the control group (9.6%). However, regarding feeling well-informed about the benefits of epidural anesthesia, the difference between the intervention group (30.5%) and the control group (33.7%) was less pronounced. Lastly, a higher percentage of participants in the intervention group

(54.9%) indicated a preference for natural methods of pain relief over epidural anesthesia compared to the control group (32.5%).

In the intervention group, 67 out of 82 participants (81.7%) reported using obstetric epidural anesthesia for pain relief during labor in their previous pregnancy. All of them (100%) indicated being satisfied with the use of obstetric epidural anesthesia for labour pain relief, and they would recommend it for other pregnant women.

In the control group, 71 out of 83 participants (85.5%) reported using obstetric epidural anesthesia for pain relief during labor in their previous pregnancy. However, information about satisfaction with its use and the willingness to recommend it to others was not available in this group.

Discussion of findings

Knowledge

The findings from our study suggest a noteworthy impact of educational interventions on the knowledge and perception of obstetric epidural anesthesia among women in labour. In the intervention group, comprising those who likely received educational sessions or informational materials, a significantly higher proportion of participants demonstrated awareness and understanding of obstetric epidural anesthesia compared to the control group. For instance, 97.6% of participants in the intervention group had heard about obstetric epidural anesthesia, indicating a substantial improvement in awareness levels. This aligns with previous research by¹⁰, which emphasized the pivotal role of informed decision-making in enhancing women's birth experiences. Moreover, a greater percentage of participants in the intervention group correctly identified anesthesiologists as the healthcare professionals trained to administer epidural anesthesia, highlighting the effectiveness of educational interventions in clarifying misconceptions and providing accurate information.

Furthermore, our results revealed that a higher proportion of participants in the intervention group believed in the effectiveness of obstetric epidural anesthesia for pain relief during labor compared to the control group. This finding corroborates with studies conducted^{11,12,13}, which emphasized the positive impact of knowledge on women's perception of epidural anesthesia. The increased awareness of the benefits and risks associated with epidural anesthesia among women in the intervention group suggests that educational initiatives can empower women to make informed decisions aligned with their preferences and values. Additionally, the recognition of potential risks, such as loss of bladder control, among a larger percentage of participants in the intervention group underscores the importance of comprehensive education in addressing concerns and mitigating fears associated with obstetric interventions.

Perception

The findings indicating a higher percentage of participants in the intervention group expressing positive perceptions about epidural anesthesia compared to the control group underscore the potential impact of educational interventions on shaping women's attitudes and beliefs towards pain management during labor. Specifically, the significantly higher proportion of participants in the intervention group believing that epidural anesthesia is an effective method of pain relief during labour highlights the effectiveness of educational initiatives in disseminating accurate information about the benefits of epidural anesthesia. This aligns with previous studies by^{1,7,14}, which emphasized the documented effectiveness of epidural anesthesia in providing pain relief during labour.

Moreover, the greater number of participants in the intervention group believing that epidural anesthesia can improve their overall birth experience suggests that educational interventions may contribute to a more positive perception of childbirth experiences among women. This finding resonates with research by^{8,15}, which demonstrated that well-informed women tend to have more positive perceptions of childbirth experiences, feeling a sense of control and empowerment. Additionally, the higher percentage of participants in the intervention group expressing concerns about the potential side effects of epidural anesthesia highlights the importance of providing comprehensive information about both the benefits and risks of epidural anesthesia to facilitate informed decision-making.

Furthermore, the greater trust in the expertise of healthcare providers administering epidurals among participants in the intervention group indicates that educational interventions may enhance confidence in healthcare professionals and the safety of epidural anesthesia. However, the similar levels of feeling well-informed about the benefits of epidural anesthesia between the intervention and control groups suggest that while educational interventions may improve knowledge, they may not significantly impact perceptions of being well-informed about the benefits of epidural anesthesia. Lastly, the higher preference for natural methods of pain relief over epidural anesthesia among participants in the intervention group highlights the importance of addressing individual preferences and values in childbirth education programs. While epidural anesthesia may offer effective pain relief, it is essential to recognize and respect women's preferences for alternative pain management methods.

Utilization

The findings reveal a high utilization rate of obstetric epidural anesthesia among participants in both the intervention and control groups, with 81.7% and 85.5% reporting its use, respectively. This high utilization rate underscores the importance of access to obstetric epidural anesthesia as a preferred method for pain relief during labour among women. However, it is noteworthy that the intervention group had a slightly lower utilization rate compared to the control group, which may be attributed to factors such as differences in healthcare provider recommendations or individual preferences.

Additionally, the results indicate a high level of satisfaction with the use of obstetric epidural anesthesia among participants in the intervention group, with all respondents indicating satisfaction and willingness to recommend it to other pregnant women. This high satisfaction rate suggests that obstetric epidural anesthesia is perceived as an effective and desirable option for pain management during labor among those who have utilized it, aligning with previous research highlighting the positive experiences of women who opt for epidural anesthesia during childbirth.^{16,17} In contrast, data on satisfaction and willingness to recommend obstetric epidural anesthesia were not available for the control group, limiting the comparison of experiences between the two groups. Nevertheless, the high utilization rate in both groups underscores the importance of ensuring access to obstetric epidural anesthesia as part of comprehensive maternity care services, particularly in promoting positive birth experiences and maternal satisfaction.

CONCLUSION

Implication to nursing

The implications of this study for nursing practice are profound, emphasizing the pivotal role of nurses in educating and supporting pregnant women regarding obstetric epidural anesthesia. Nurses play a crucial role in antenatal care, serving as primary educators and advocates for expectant mothers. By integrating comprehensive education on epidural anesthesia into prenatal counseling sessions, nurses can empower women with accurate information about pain management options during labor. Additionally, nurses can address any misconceptions or fears that pregnant women may have about epidural anesthesia, thereby promoting informed decision-making and enhancing maternal satisfaction with the birthing experience. Furthermore, nurses can collaborate with other healthcare providers to ensure that obstetric epidural anesthesia is administered safely and effectively, optimizing maternal comfort and well-being during labor. Overall, this study underscores the importance of nursing interventions aimed at improving women's knowledge, perception, and utilization of obstetric epidural anesthesia, ultimately enhancing the quality of care provided to pregnant women.

REFERENCES

1. ACOG. Analgesia and cesarean delivery rates. Committee Opinion Number 339. 2006 Jun;1-2.
2. Women and Newborn Health Services, King Edward Memorial Hospital. Epidural analgesia in labour. Clinical guidelines relevant to anaesthetists. Available from: http://www.kemh.health.wa.gov.au/development/manuals/O&G_guidelines/sectione/4/e4.1.pdf
3. **Geddawy M**, Alkraydees SS, Almadhi MM, *et al*. Knowledge about epidural analgesia among women in Al-Qassim Province of Saudi Arabia. *Cureus*. 2023;15(5)
4. **Gari A**, Aziz A, ALSaleh N, *et al*. Awareness of epidural analgesia among pregnant women in Jeddah, Saudi Arabia. *Electron Physician*. 2017;9(5):4274-4280.
5. **Oladokun A**, Eyelade O, Morhason-Bello I, *et al*. Awareness and desirability of labor epidural analgesia: a survey of Nigerian women. *Int J Obstet Anesth*. 2009;18(1):38-42.
6. **Ali Alahmari SS**, Almetrek M, Alzillae AY, *et al*. Knowledge, attitude, and practice of childbearing women toward epidural anesthesia during normal vaginal delivery in Alsanayeah Primary Health Care in Khamis Mushait. *J Family Med Prim Care*. 2020;9(1):99-104.
7. **Aldammas F**, Alshihri AA, Alhowaish RK, *et al*. Awareness, preconception, and fear of epidural analgesia among childbearing women in Saudi Arabia: an observational cross-sectional study. *Saudi J Anaesth*. 2023;17(1):45-57.
8. **Ezeonu PO**, Anozie OB, Onu FA, *et al*. Perceptions and practice of epidural analgesia among women attending antenatal clinic in FETHA. *Int J Women's Health*. 2017;9:905-911.
9. **Petersen A**, Penz SM, Gross MM. Women's perception of the onset of labour and epidural analgesia: a prospective study. *Midwifery*. 2013;29(4):284-293.
10. **Deng Y**, Lin Y, Yang L, *et al*. A comparison of maternal fear of childbirth, labor pain intensity and intrapartum analgesic consumption between primiparas and multiparas: a cross-sectional study. *Int J Nursing Sci*. 2021;8(4):380-387.
11. **Olaleye O**, Dada SO, Alabi GO. Awareness and utilization of obstetric epidural analgesia in labour among pregnant women in Wesley Guild Hospital Ilesha, Nigeria. *Int Q Community Health Educ*. 2020;272684X20972839. Advance online publication.
12. **Dominicé Dao M**, Gerosa D, Pélieu I, Haller G. Allophone immigrant women's knowledge and perceptions of epidural analgesia for labour pain: a qualitative study. *BMJ Open*. 2022;12(4).
13. **Hodnett ED**. Pain and women's satisfaction with the experience of childbirth: a systematic review. *Am J Obstet Gynecol*. 2002;186(suppl)
14. **Brown ST**, Campbell D, Kurtz A. Characteristics of labour pain at two stages of cervical dilation. *Pain*. 1989;38:289-295.
15. **Fairlie FM**, Marshall L, Walker JJ, Elbourne D. Intramuscular opioids for maternal pain relief in labour: a randomized controlled study comparing pethidine with diamorphine. *Br J Obstet Gynaecol*. 1999;106:1181-1187.
16. **Fanning RA**, Briggs LP, Carey MF. Epidural analgesia practices for labour: results of a 2005 national survey in Ireland. *Eur J Anaesthesiol*. 2009;26:235-244.
17. **Imarengiaye CO**, Ande AB. Demand and utilisation of labour analgesia service by Nigerian women. *J Obstet Gynaecol*. 2006;26:130-132.