

## ORIGINAL ARTICLE

### Assessment of Regional Anaesthesia Exposure and Utilisation by Anaesthetists in Nigeria

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**ABSTRACT** **Background:** Although regional anaesthesia (RA) is a vital component of modern anaesthesia, it is underutilised and RA exposure appears to be limited in Nigeria.

**Aim:** This study explored the exposure and use of RA among anaesthesia residents in Nigeria.

**Material:** This was a prospective, cross-sectional study. A simple, convenience-based sampling was employed. Participants were contacted via Google forms using a self-administered structured questionnaire. The self-reported levels of access, exposure, competence, practice, and mentorship were assessed. Descriptive statistics were used to summarise results.

**Results:** From 180 questionnaires, 129 were returned, i.e., 71.6% response rate. Of the responder's centers, 92 (71.3%) were fully accredited, while 35 (27.1%) had partial accreditation. Daily exposure to SA and EA was 64 (49.6%) and 11 (8.5%), respectively, with 120 (93.0%) and 36 (27.9%) reporting competence. Daily or weekly exposure to PNBs was  $\leq 5\%$  in all categories. Four (3.1%) had competence in LLNB. Spinal and epidural kits were accessible to 126 (97.7%) and 85 (65.9%), respectively, while 6 (4.6%) had nerve stimulators and 11 (8.5%) had ultrasound. Mentorship was universal i.e., 129 (100%) for neuraxial techniques, but 9 (6.9%) for PNBs.

**Conclusion:** The study highlights gaps in regional anaesthesia practice in Nigeria. Despite universal access to neuraxial blocks, limited exposure to PNBs reduces proficiency. Improving RA services requires access to equipment, mentorship, simulation, and curriculum reforms aligning with global standards.

**Keywords:** Regional anaesthesia, Spinal anaesthesia, Epidural anaesthesia, CSE, Peripheral nerve blocks, Nigeria.

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## INTRODUCTION

Regional anaesthesia (RA) is an integral component of modern anaesthesia care.<sup>1</sup> Advantages include safety, efficiency, reliability, and usefulness where general anaesthesia (GA) is undesirable. Others are airway- and opioid-sparing, and reduced bleeding, postoperative nausea and vomiting (PONV), and thromboembolism risks. RA's role in enhanced recovery after surgery (ERAS) is established.<sup>1,2</sup>

The goals of anaesthesia, i.e., safety, comfort, and rapid return to the pre-operative state are often compromised in low-resource countries (LRCs).<sup>2,3,4,5</sup> However, the availability and use of RA which provides superior intraoperative physiology, haemodynamic stability and perioperative analgesia are limited in LRCs due to lack of skills and resources.<sup>3</sup> For instance, the Lancet Commission reported a severe shortfall in access to safe anaesthesia services in Nigeria, and underscored the need to expand capacity and systems to meet the demand.<sup>6</sup>

In settings with a constricted supply of oxygen, power, and consumables, RA offers a transformative approach. It lowers case cancellations, improves turnover, and is cost-effective.<sup>4,5</sup>

Yet, RA is underutilised in Africa, where it is most needed, due to a lack of trained specialists.

For instance, there are 0.25 – 0.58 physician anaesthetists per 100,000 population in Nigeria,<sup>7</sup> against 5 per 100,000, which is recommended by the Global Anaesthesia Workforce.<sup>8</sup>

Proficiency in RA techniques directly correlates with the frequency of exposure and practice.<sup>9,10</sup> Studies from the United States<sup>11</sup> and the United Kingdom<sup>12</sup> suggest that anaesthesia residents reported higher proficiency with practice and exposure.

There are limited studies assessing the level of resident anaesthetist's exposure to RA in Nigeria. This study aims to identify access, experience, practice, level of competence, and barriers and, propose modalities to improve RA services in Nigeria.

## MATERIALS AND METHODS

This descriptive cross-sectional study assessed exposure, proficiency, and use of RA techniques by anaesthesia residents in Nigeria. The study analysed responses to a survey that was sent to residents. The data was obtained from structured questionnaires adapted from existing literature. Senior anaesthetists were asked to validate the questionnaire. Also, a pilot study conducted selected anaesthesia residents, verified the questions and corrections were made.

The survey was conducted between December 2024 and February 2025.

Responses from residents in anaesthesia training who completed the questionnaire were included. Questionnaires that were incomplete, lost, or unreturned were excluded.

A simple, purposive, convenience-based sampling was employed. The questionnaire was distributed via Google forms to residents on the WhatsApp page of the Nigerian Society of Anaesthetists (NSA) Appendix I. Additionally, residents were reached through contact persons in various institutions across the country.

The questionnaire captured demographic, e.g., age, sex, and years of residency. Others were RA exposure i.e., frequency of exposure to spinal anaesthesia (SA), epidural anaesthesia (EA), combined spinal-epidural (CSE) and peripheral nerve blocks (PNBs) such as upper limb nerve blocks (ULNB) e.g., the interscalene block (ISB), supraclavicular block (SCB), infraclavicular block (ICB), and axillary block (AxB); truncal block e.g., the transversus abdominis plane (TAP) block, and ilio-inguinal/ilio-hypogastric nerve block (IIIH-NB; and lower limb nerve blocks (LLNB) e.g. femoral nerve block (FNB), fascia iliaca block (FIB), lumbar plexus (psoas compartment) block (LPB/PCB), the lateral femoral cutaneous nerve block (LFCNB), adductor block (AB), and the popliteal sciatic nerve block (PSNB).

Self-reported level of competence, access to resources, e.g., ultrasound-nerve stimulators, and structured mentorship were assessed.

**Data Analysis:** Data were collected, cleaned and analysed using the Statistical Package for the Social Sciences (SPSS) (IBM, Chicago, Illinois, USA) version 25.0. Descriptive statistics, e.g., frequencies and percentages as well as means, and standard deviations were used to summarise demographic data, RA exposure, competence, and training.

## RESULTS

There were 129 responses, out of 180 contacts, i.e., 71.6%, with a male and female ratio of 1.4:1. Years of training were fairly distributed. Accreditation was full in 92 (71.3%), partial in 35 (27.1%) and none in 2 (1.6%) centers (Table 1).

Daily and weekly-monthly exposure to SA were 64 (49.6%) and 60 (46.5%), and EA were 11 (5.8%) and 76 (58.9%). Full competence was reported by 120 (93.0%) in SA and 36 (27.9%) in EA. Sixteen residents (12.4%) had regular CSE exposure, 54 (41.9%) had none, while 35 (27.1%) reported competence. Daily or weekly exposure to peripheral nerve blocks (PNBs) was  $\leq 5\%$  in all categories (Table 2).

For ULNB, 18 (13.9%) had performed SCB, while ISB and ICB were each performed by two (1.6%) residents. For truncal blocks, 6 (4.7%) reported IIIH-NB, and only one (0.8%) reported TAP block. For LLNBs, only 2 (1.6%) reported PNB, and none were performing FNB, FIB, LBP/PCB, LFCNB, or AB. SA and EA kits were accessible to 126 (97.7%) and 85 (65.9%), participants respectively. Nerve stimulators were accessible to 6 (4.6%), while ultrasound was available to 11 (8.5%). Mentorship was universal for neuraxial techniques (129, 100%) but limited for PNBs (9, 6.9%). All (100%) wish to learn RA techniques (Table 3).

**Table I: Demographic and Workplace Profile**

Parameter	Variable N = 129 (n – %)	
Age group	$\leq 30$ years	23 (17.8)
	31 – 40 years	73 (56.6)
	41 – 50 years	30 (23.3)
	> 50 years	3 (2.3)
Sex	Male	76 (58.9)
	Female	53 (41.1)
Years of residency	1	24 (18.6)
	2	27 (20.9)
	3	26 (20.2)
	4	15 (11.6)
	5	37 (28.7)
Type of hospital	Federal	102 (79.1)
	State	24 (18.6)
	General	3 (2.3)
	Private	0 (0.0)
Accreditation status	Full	92 (71.3)
	Partial	35 (27.1)
	None	2 (1.6)

**Table II: Self-reported Exposure and Competence Profile in Selected RA Techniques**

Technique	Frequency of Exposure	Level of Competence
	N – 129	N – 129
	(n – %)	(n – %)
SAB	Daily – 64 (49.6)	C – 120 (93.0)
	Weekly/Monthly – 60 (46.5)	US – 7 (5.4)
	Rarely/Never – 5 (3.9)	NC – 2 (1.6)
EA	Daily – 11 (5.8)	C – 36 (27.9)
	Weekly/Monthly – 76 (58.9)	US – 85 (65.9)
	Rarely/Never – 42 (35.3)	NC – 8 (6.2)
CSE	Daily/Weekly – 16 (12.4)	C – 35 (27.1)
	Rarely – 59 (45.7)	US – 84 (65.1)
	Never – 54 (41.9)	NC – 10 (7.8)
ULNB	Daily/Weekly – 4 (3.1)	C – 4 (3.1)
	Rarely/Never – 125 (96.9)	US/NC – 125 (96.9)
LLNB	Daily/Weekly – 6 (4.7)	C – 2 (1.6)
	Rarely/Never – 123 (95.3)	US/NC – 127 (98.4)
Truncal blocks	Daily/Weekly – 3 (2.3)	C – 2 (1.6)
	Rarely/Never – 126 (97.7)	US/NC – 127 (98.4)
Scalp block	Daily/Weekly – 2 (1.6)	C – 2 (1.6)
	Rarely/Never – 127 (98.4)	US/NC – 127 (98.4)

C: Competent

US: Under supervision

NC: not competent

**Table III: Exposure and Practice profile of Peripheral Nerve Blocks**

Item	Variable (n, %)	
	N – 129	(n – %)
ULNB	ISB	2 (1.6)
	SCB	18 (13.9)
	ICB	2 (1.6)
	AxB	0 (0.0)
	TAP	1 (0.8)
Truncal	IIIH – NB	6 (4.7)
	FNB	0 (0.0)
	FIB	0 (0.0)
	AB	0 (0.0)
	LFCNB	0 (0.0)
Regular access to RA equipment	PSNB*	2 (1.6)
	SA kit	126 (97.7)
	EA kit	85 (65.9)
	Nerve stimulator	6 (4.6)
Access to Mentorship	Ultrasound	11 (8.5)
	SA/EA/CSE	129 (100)
	PNB**	9 (6.9)
Number who wish to learn RA techniques		129 (100%)

\*Popliteal Sciatic Nerve Block (PSNB)

\*\*Peripheral Nerve Blocks (PNB)

### Abbreviations

AB – Adductor block

AXB – Axillary block

CSE – Combined Spinal-Epidural

EA – Epidural anaesthesia

FIB – Fascia Iliaca block

FNB – Femoral nerve block

GA – General anaesthesia

ICB – Infraclavicular block

II/IH-NB – Ilio-inguinal/Ilio-hypogastric nerve block

ISB – Interscalene block

LFCNB – Lateral Femoral Cutaneous nerve block

LLNB – Lower limb nerve block

LPB/PCB – Lumbar plexus (Psoas compartment) block

NSA – Nigerian Society of Anaesthetist

PNB – Peripheral Nerve Blocks

PSNB – Popliteal Sciatic nerve block

RA – Regional anaesthesia

SA – Spinal anaesthesia

SCB – Supraclavicular block

TAP – Transversus Abdominis Plane block

ULNB – Upper Limb nerve blocks

USS – Ultrasound

### DISCUSSION

This study assessing the clinical experience and practice of RA services in Nigeria reported a high proficiency in neuraxial techniques among anaesthesia residents, with limited competence in PNB.

A 71.5% response rate was obtained from residents across Nigeria, representing 98.4% from fully or partially accredited training programs. These respondents were at various levels of training and had exposure to a wide range of surgeries and surgical specialties.

Unsurprisingly, we found that SA was the principal RA technique. SA is widely applied in trauma, obstetrics, gynaecological, plastic, urological, and general surgery.<sup>2</sup> Nearly 93% of residents reported competence in SA, emphasising its central role, while 27.9% and 27.1% reported same in EA and CSE respectively. The high competence in neuraxial block is reassuring, given its pivotal role in safe surgery.<sup>1,2</sup> It is simple, reliable, requires minimal equipment, and effective.

However, the study found low exposure to PNB, with under 5% of residents having regular experience. SCB was performed by 13.9% of respondents, while

other nerve block such as AxB and FNB exposure were absent.

Similarly, Rukewe et al<sup>3</sup> reported that among Nigerian anaesthetists, 92.9%, 15%, and 2.9% regularly use SA, EA, and PNB respectively, with 47.1% never performing a nerve block. In comparison, the reported 27.9% EA competence in this study is an improvement. This may result from increased access to EA kits, better training, which promote more regular practice by the Nigerian anaesthetists, over the years.

On the contrary, a survey of 42 United States anaesthesia programs found excellent and moderate proficiency in neuraxial and PNB respectively, based on exposure.<sup>11</sup> Additionally, a European study of 492 trainees reported proficiency in limb blocks, low confidence in truncal blocks and in non-obstetric epidurals.<sup>12</sup> These studies highlight how practice builds confidence.

The limited competence in PNB is concerning. PNB is beneficial in systems that is burdened by reduced resources, monitoring, intensive care and bed space. It provides earlier mobilisation, haemodynamic stability, preserves consciousness and airway reflexes, attenuates metabolic responses, and provides flexibility, i.e., can be used alone, as adjunct for GA or for postoperative analgesia.<sup>9,10</sup>

In this study, 6.9% of respondent reported regular access to mentorship. This is low compared to a 70% of the anaesthesia residents in a UK survey who reported access to supervised training.<sup>12</sup> RA proficiency requires frequent practice, positive, and reinforced feedback through mentorship. Lack of specialists with post-fellowship training in RA may be responsible. Low proficiency indicates low independent practice, reduced options for surgery, and higher reliance on GA.<sup>4,5</sup> Modern surgery requires versatility in anaesthetic techniques, with choices tailored to age, American Society of Anesthesiologists (ASA) physical status, comorbidities, fasting state, surgical duration and severity, fluid shifts, pain, institutional practices, elective or emergency procedure.<sup>2,8,9</sup>

The reduced PNB exposure and practice fall below the global standard. The European<sup>13</sup> and North American<sup>14</sup> anaesthesia programs treat PNB as core skills. In such settings, anaesthesia resident's graduate with proficiency in wide number of PNBs including limb and truncal blocks. The Lancet Commission on Global Surgery reported that in settings with limited intensive care units (ICUs), robust RA practices can reduce perioperative mortality.<sup>4</sup>

The study highlights an infrastructural gap and low workforce, noting that while SA and EA kits were widely available, access to ultrasound and nerve stimulators was limited.<sup>9</sup> Without a workforce proficient in diverse RA techniques, Nigeria cannot guarantee universal access to safe, and affordable surgery. Progress demands investment in infrastructure, structured training beyond neuraxial block, faculty development,

mentorship, and RA integration into national surgical strategies.<sup>5,6</sup>

Improving RA services in Nigeria requires broader specialist access, competence-based training, and access to ultrasound, nerve stimulators, local anaesthetic, adjuvants, and lipid emulsion. Supportive policies, funding, insurance, task-sharing, theatre-use protocols, public-private partnerships, and PNB registries will enhance RA application in obstetrics, trauma, paediatrics, and day-case surgeries.

Importantly, all residents demonstrated interest in learning RA techniques, which showcase potential to strengthen proficiency through structured exposure and guided practice.

The strength of this study is the direct reports from residents across accredited centers in Nigeria. However, limitations include the reliance on self-reported competence which may overestimate true skill levels. While the study identifies gaps in practice, it does not explore institutional barriers such as workload, staffing, or case-handling policies. The cross-sectional design precludes conclusions about changes in exposure or competence over time. The use of simple convenience sampling may introduce selection bias that limits inclusiveness. Thus, residents with varying RA exposure levels might have been excluded, potentially serving as a source of confounding.

## CONCLUSION

This study reveals significant gaps in regional anaesthesia services in Nigeria. While SA remains essential, limited proficiency in PNBs undermines safe surgery. Addressing this requires investing in equipment, mentorship, simulation training, and curriculum reforms which aligned with global standards.

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**Conflicts of interest:** There are no conflicts of interest.

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**APPENDIX I**  
**QUESTIONNAIRE**

**ASSESSMENT OF EXPOSURE AND UTILISATION OF REGIONAL ANAESTHESIA BY  
ANAESTHETISTS IN NIGERIA**

Dear Doctor,

This questionnaire is designed to assess the exposure, experience, and training of resident anaesthetists in regional anaesthesia techniques across Nigeria. Your participation is voluntary, and all responses will remain strictly anonymous. The data collected will be used solely for academic and research purposes. By proceeding with this questionnaire, you confirm your consent to participate in this study.

**Section 1: Demographic Information**

1. Age: \_\_\_\_\_
2. Gender:  Male  Female
3. Year of Residency Training:  1st Year  2nd Year  3rd Year  4th Year  5th Year  > 5 Years
4. Type of Hospital:  Federal Teaching Hospital  State Teaching Hospital  Private Teaching Hospital  General Hospital
5. Institutional Accreditation Status:  Fully Accredited  Partially Accredited  Not Accredited

**Section 2: Exposure to Regional Anaesthesia Techniques**

6. Have you been exposed to regional anaesthesia techniques during your training?  
 Yes  No
7. If Yes, specify the types of regional anaesthetic techniques you have been exposed to:
8. How often do you perform regional anaesthesia procedures?  Daily  Weekly  Monthly  
 Rarely  Never
9. Please indicate your frequency of performing each Regional Anaesthesia techniques

Technique	Never	Rarely	Monthly	Weekly	Daily
Spinal) Anaesthesia (SA)	<input type="checkbox"/>				
Epidural Anaesthesia (EA)	<input type="checkbox"/>				
Combined Spinal–Epidural (CSE)	<input type="checkbox"/>				
Upper Limb Nerve Blocks (ULNB):					
– Interscalene Block (ISB)	<input type="checkbox"/>				
– Supraclavicular Block (SCB)	<input type="checkbox"/>				
– Infraclavicular Block (ICB)	<input type="checkbox"/>				
– Axillary Block (AxB)	<input type="checkbox"/>				
Lower Limb Nerve Blocks (LLNB):					
– Femoral Nerve Block (FNB)	<input type="checkbox"/>				
– Fascia Iliaca Block (FIB)	<input type="checkbox"/>				
– Lumbar Plexus (Psoas Compartment) Block (LPB/PCB)	<input type="checkbox"/>				
– Lateral Femoral Cutaneous Nerve Block (LFCNB)	<input type="checkbox"/>				
– Adductor Canal Block (AB)	<input type="checkbox"/>				
– Popliteal Sciatic Nerve Block (PSNB)	<input type="checkbox"/>				
Truncal Blocks:					
– Transversus Abdominis Plane (TAP) Block	<input type="checkbox"/>				
– Ilio-inguinal / Ilio-hypogastric Nerve Block (IIIH-NB)	<input type="checkbox"/>				
Scalp Block	<input type="checkbox"/>				

10. Please indicate your current level of competence for each Regional Anaesthesia technique.

Technique	Independent	Under Supervision	Not Competent
Subarachnoid (Spinal) Anaesthesia (SA)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Technique	Independent	Under Supervision	Not Competent
Epidural Anaesthesia (EA)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Combined Spinal-Epidural (CSE)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Upper Limb Nerve Blocks (ULNB):			
– Interscalene Block (ISB)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
– Supraclavicular Block (SCB)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
– Infraclavicular Block (ICB)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
– Axillary Block (AxB)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lower Limb Nerve Blocks (LLNB):			
– Femoral Nerve Block (FNB)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
– Fascia Iliaca Block (FIB)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
– Lumbar Plexus (Psoas Compartment) Block (LPB/PCB)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
– Lateral Femoral Cutaneous Nerve Block (LFCNB)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
– Adductor Canal Block (AB)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
– Popliteal Sciatic Nerve Block (PSNB)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Truncal Blocks:			
– Transversus Abdominis Plane (TAP) Block	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
– Ilio-inguinal / Ilio-hypogastric Nerve Block (IIIH-NB)	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Scalp Block	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

11. What is your preferred approach to peripheral nerve blocks?  Landmark Technique  Paresthesia Technique  Nerve Stimulator  Ultrasound-Guided  Not Competent

12. How often do you have access to the following equipment for performing regional anaesthesia in your centre?

Equipment	Frequency of Access				
Spinal Anaesthesia Kit	<input type="checkbox"/> Always	<input type="checkbox"/> Frequently	<input type="checkbox"/> Occasionally	<input type="checkbox"/> Rarely	<input type="checkbox"/> Never
Epidural Anaesthesia Kit	<input type="checkbox"/> Always	<input type="checkbox"/> Frequently	<input type="checkbox"/> Occasionally	<input type="checkbox"/> Rarely	<input type="checkbox"/> Never
Nerve Stimulator	<input type="checkbox"/> Always	<input type="checkbox"/> Frequently	<input type="checkbox"/> Occasionally	<input type="checkbox"/> Rarely	<input type="checkbox"/> Never
Ultrasound machine for Regional Anaesthesia	<input type="checkbox"/> Always	<input type="checkbox"/> Frequently	<input type="checkbox"/> Occasionally	<input type="checkbox"/> Rarely	<input type="checkbox"/> Never

13. Have you received training on ultrasound-guided regional blocks?  Yes  No

### Section 3: Training and Mentorship

14. Do you have access to mentors for regional anaesthesia training?  
 Yes  No  Sometimes

15. How often are you supervised during regional anaesthesia procedures?  
 Always  Frequently  Occasionally  Rarely  Never

16. What types of training have you received in regional anaesthesia?  
 Didactic Lectures  Live Demonstrations  Hands-on Practice  Simulation Training  Ultrasound Workshops

17. Do you feel adequately prepared to perform regional anaesthesia independently?  
 Yes  No  Maybe

18. How confident are you in performing regional anaesthesia procedures?  
 Very Confident  Confident  Neutral  Not Confident  Very Insecure

19. Have you ever performed ultrasound-guided nerve blocks independently?  
 Yes  No

20. If Yes, please specify which block(s): \_\_\_\_\_

21. Do you wish to learn ultrasound-guided regional anaesthesia?  
 Yes  No

**Section 4: Barriers to Training**

22. What are the major barriers to regional anaesthesia training in your centre? (Select all that apply)

- Lack of Ultrasound Machines
- Limited Patient Load
- Inadequate Number of Supervisors
- Insufficient Hands-on Training Opportunities
- Lack of Simulation Models
- Inadequate Educational Resources
- Others (Please specify): \_\_\_\_\_

**Section 5: Suggestions and Comments**

23. What suggestions do you have to improve regional anaesthesia training in Nigeria?

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