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RESEARCH ARTICLE

OUTCOME OF LUMBAR SPINE SURGERY USING SPINAL ANAESTHESIA IN NIGERIA: A MULTI-CENTRE REVIEW

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Abstract

Background: Lumbar spine surgery is traditionally performed under general anaesthesia (GA). However, spinal anaesthesia (SA) has emerged as a safe and effective alternative, offering potential benefits in perioperative outcomes, cost, and recovery. This multi-centre study evaluated the outcomes of lumbar spine surgery performed under SA in Nigeria and identified predictors of favourable outcomes.

Methods: A retrospective multi-centre cohort study of 232 patients who underwent lumbar spine surgery under SA across four tertiary centers in Nigeria from January 2010 to December 2024 was conducted Procedures included discectomy (n=98), laminectomy (n=89), and fusion (n=45). Outcomes measured included Visual Analogue Scale (VAS) for pain, length of hospitalization, opioid use, functional independence (Oswestry Disability Index, ODI), return to work, sexual satisfaction, and mortality. Multivariate logistic regression identified predictors of favourable outcomes.

Results: The mean age was 52.4±12.6 years; 132 (56.9%) were male. Significant improvements were observed in VAS (7.6±1.4 preoperative ly to 2.8±1.6 postoperatively, $p<0.001$) and ODI (58.4±14.2 to 26.8±13.5, $p<0.001$). Mean length of hospital stay was 4.2±1.8 days. Postoperative opioid use was required in 28 patients (12.1%). Return to work was achieved in 78.0% (181/232), and sexual satisfaction was reported by 68.5%(159/232). Two deaths (0.9%) occurred. Independent predictors of favourable outcome included: age <60 years (adjusted OR 3.2, 95% CI: 1.5–6.8), absence of comorbidities (OR 2.8, 95% CI: 1.3–5.9), discectomy procedure (OR 2.4, 95% CI: 1.1–5.2), and single-level surgery (OR 2.2, 95% CI: 1.0–4.8).

Conclusions: Lumbar spine surgery under spinal anaesthesia is associated with significant pain relief, functional improvement, short hospital stay, low opioid requirement, and favourable return-to-work and sexual satisfaction rates in this Nigerian multi-centre cohort. Spinal anaesthesia is a safe and effective alternative to general anaesthesia in carefully selected patients.

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Introduction:-

Lumbar spine surgery is one of the most commonly performed orthopaedic procedures worldwide, addressing conditions such as lumbar disc herniation, spinal stenosis, and degenerative spondylolisthesis (1,2). Traditionally, these procedures have been performed under general anaesthesia (GA) with endotracheal intubation, a practice driven by the need for a secured airway, patient positioning, and surgeon comfort (3). However, spinal anaesthesia (SA) has emerged as a safe and effective alternative, offering numerous potential benefits (4).

The use of SA in lumbar spine surgery has gained traction due to evidence suggesting favourable perioperative haemodynamic stability, reduced intraoperative blood loss, lower mortality, and decreased risk of pulmonary embolism and myocardial infarction (5,6). A Nigerian study of 242 patients who underwent lumbar spine surgery under SA reported satisfactory postoperative outcomes(7). A comparative Nigerian study of 50 patients undergoing lumbar laminectomy found that SA offered a better early postoperative recovery profile than GA, as evidenced by significantly lower pain scores at 4 hours postoperatively (8).

A systematic review and meta-analysis of spinal versus general anaesthesia in decompressive lumbar surgeries found that awake surgery was associated with shorter surgery duration and a lower risk of postoperative complications, including nausea and vomiting (9). An umbrella review of seven meta-analyses identified potential advantages of SA, including shorter operative time, reduced length of stay, lower intraoperative blood loss, and reduced postoperative analgesic requirements, while finding no consistent differences in haemodynamic events or overall complications (4). A prospective comparative study from Iraq demonstrated that SA was associated with significantly lower intraoperative blood loss, better haemodynamic stability, higher surgeon and patient satisfaction, and reduced 24-hour analgesic requirements compared to GA (10).

In resource-limited settings such as Nigeria, where shortages of anaesthetists and anaesthetic machines are prevalent, SA offers a cost-effective alternative that can increase patient turnover and reduce healthcare costs (11,12). A protocol for lumbar spine surgery under SA in resource-limited countries has been proposed, emphasizing reduced opioid usage, improved anaesthesia outcomes, and suitability for patients who do not favour GA (6). Despite these advantages, the adoption of SA for lumbar spine surgery remains limited in many centres. This multi-centre study aimed to evaluate the outcomes of lumbar spine surgery performed under SA in Nigeria and to identify predictors of favourable outcomes.

Methodology:-

Study Design and Setting:-

This was a retrospective multi-centre cohort study conducted across four tertiary centres in Nigeria: National Orthopaedic Hospital Dala, Kano; University of Abuja Teaching Hospital Gwagwalada Abuja, Kwara State University Teaching Hospital Ilorin, and Muhammadu Buhari Specialist Hospital Kano. The study period was 1 January 2010 to 31 December 2024. Ethical approval was obtained from the institutional research ethics committees of all participating centres. Individual patient consent was waived due to the retrospective nature.

Participants:-

All consecutive adult patients (≥18 years) who underwent elective lumbar spine surgery under spinal anaesthesia during the study period were eligible. Inclusion criteria: (1) lumbar spine surgery (discectomy, laminectomy, or fusion) performed under SA; (2) complete medical records; (3) minimum 6-month follow-up. Exclusion: patients with instrumented fusion requiring more than two levels, emergency surgery, or incomplete records. A total of 232 patients met the inclusion criteria: 98 discectomy, 89 laminectomy, and 45 fusion procedures.

Anaesthetic Technique:-

Spinal anaesthesia was performed using a standardised protocol across all centres. Patients were premedicated with midazolam 0.02 mg/kg intravenously. Lumbar puncture was performed at the L3–L4 or L4–L5 interspace using a 25-gauge or 27-gauge Quincke needle. Hyperbaric bupivacaine 0.5% (10–15 mg) was administered, with or without fentanyl 10–25 mcg. The sensory block level was targeted at T10 or higher. Patients were positioned prone after confirmation of an adequate block. Intraoperative sedation with propofol or midazolam was administered as needed.

Data Collection:-

Data were extracted from patient case files, anaesthesia records, operative notes, and follow-up records. Variables collected included: age, sex, body mass index (BMI), comorbidities (hypertension, diabetes, etc.), type of surgery

(discectomy, laminectomy, fusion), number of levels, operative time, intraoperative complications, and length of hospital stay.

Outcome Measures:-

- **Pain:** Visual Analogue Scale (VAS, 0–10) measured preoperatively and at 6-month follow-up.
- **Functional disability:** Oswestry Disability Index (ODI, 0–100) measured preoperatively and at 6-month follow-up.
- **Length of hospitalization:** Total days from surgery to discharge.
- **Opioid use:** Requirement for opioid analgesia postoperatively (excluding the first 24 hours).
- **Return to work:** Ability to resume pre-injury employment or alternative gainful employment within 6 months.
- **Sexual satisfaction:** Patient-reported satisfactory sexual function at 6 months.
- **Mortality:** All-cause mortality within 30 days of surgery.

Statistical Analysis:-

Data were analysed using SPSS version 26. Continuous variables are presented as mean±SD, categorical as frequencies (%). Comparisons between groups used independent t-test for continuous variables and chi-square for categorical variables. Univariate and multivariate logistic regression identified predictors of favourable outcome (defined as ≥50% reduction in VAS and ODI improvement ≥15 points). Variables with $p<0.10$ in univariate analysis were entered into the multivariate model. Adjusted odds ratios (OR) with 95% confidence intervals (CI) were calculated. Statistical significance was set at $p<0.05$.

Results:-

Patient Characteristics:-

A total of 232 patients were included. The mean age was 52.4±12.6 years; 132 (56.9%) were male. The most common indication was lumbar disc herniation (42.2%), followed by spinal stenosis (38.4%) and degenerative spondylolisthesis (19.4%). Discectomy was performed in 98 patients (42.2%), laminectomy in 89 (38.4%), and fusion in 45 (19.4%). Single-level surgery was performed in 168 patients (72.4%) and multi-level in 64 (27.6%). Table 1 presents the baseline characteristics.

Table 1. Baseline Characteristics of 232 Patients

Characteristic	Category n (%)
Age (years) Mean±SD	52.4 ± 12.6
<60 years	148 (63.8)
≥60 years	84 (36.2)
Sex	
Male	132 (56.9)
Female	100 (43.1)
BMI (kg/m²) Mean±SD	26.2 ± 4.1
Comorbidities	
Yes	76 (32.8)
No	156 (67.2)
Surgery type	
Discectomy	98 (42.2)
Laminectomy	89 (38.4)
Fusion	45 (19.4)
Number of levels	
Single-level	168 (72.4)
Multi-level	64 (27.6)
Operative time (min) Mean±SD	95.2 ± 28.6

Clinical Outcomes:-

Table 2 presents the clinical outcomes. Significant improvements were observed in VAS (7.6±1.4 preoperatively to 2.8±1.6 postoperatively, $p<0.001$) and ODI (58.4±14.2 to 26.8±13.5, $p<0.001$). The mean length of hospital stay

was 4.2±1.8 days. Postoperative opioid use was required in 28 patients (12.1%). Return to work was achieved in 181 patients (78.0%), and sexual satisfaction was reported by 159 patients (68.5%). Two deaths (0.9%) occurred, both in patients with significant comorbidities who developed postoperative sepsis.

Table 2. Clinical Outcomes

Outcome	Preoperative	Postoperative	p-value
VAS (0–10)	7.6 ± 1.4	2.8 ± 1.6	<0.001
ODI (0–100)	58.4 ± 14.2	26.8 ± 13.5	<0.001
Outcome	Value		
Length of hospital stay (days)	4.2 ± 1.8		
Postoperative opioid use n (%)	28 (12.1)		
Return to work n (%)	181 (78.0)		
Sexual satisfaction n (%)	159 (68.5)		
Mortality n (%)	2 (0.9)		

Outcomes by Surgery Type:-
Table 3 presents outcomes stratified by surgery type. Discectomy patients had the shortest hospital stay (3.5±1.2 days) and lowest opioid use (8.2%), while fusion patients had the longest stay (5.8±2.1 days) and highest opioid use (20.0%). Return to work was highest in the discectomy group (86.7%) and lowest in the fusion group (62.2%).

Table 3. Outcomes by Surgery Type

Outcome	Discectomy (n=98)	Laminectomy (n=89)	Fusion (n=45)	p-value
Hospital stay (days)	3.5 ± 1.2	4.0 ± 1.5	5.8 ± 2.1	<0.001
Opioid use n (%)	8 (8.2)	10 (11.2)	9 (20.0)	0.04
Return to work n (%)	85 (86.7)	69 (77.5)	28 (62.2)	0.002
Sexual satisfaction n (%)	74 (75.5)	60 (67.4)	25 (55.6)	0.03
Mortality n (%)	0 (0)	0 (0)	2 (4.4)	0.02

Complications:
Intraoperative and postoperative complications were recorded in 18 patients (7.8%). The most common complications were dural tear (3.0%), post-dural puncture headache (2.2%), and hypotension requiring intervention (1.7%). No patient developed neurological deficit, epidural haematoma, or deep surgical site infection.

Predictors of Favourable Outcome:-
Univariate analysis identified age <60 years, absence of comorbidities, discectomy procedure, and single-level surgery as factors associated with favourable outcome (p<0.10). Multivariate logistic regression retained four independent predictors (Table 4):
· **Age <60 years:** adjusted OR 3.2 (95% CI: 1.5–6.8), p=0.002
· **Absence of comorbidities:** adjusted OR 2.8 (95% CI: 1.3–5.9), p=0.008
· **Discectomy procedure:** adjusted OR 2.4 (95% CI: 1.1–5.2), p=0.03
· **Single-level surgery:** adjusted OR 2.2 (95% CI: 1.0–4.8), p=0.048

Table 4. Predictors of Favourable Outcome (Multivariate Analysis)

Predictor	Adjusted OR	95% CI	p-value
Age <60 years	3.2	1.5 – 6.8	0.002
Absence of comorbidities	2.8	1.3 – 5.9	0.008
Discectomy procedure	2.4	1.1 – 5.2	0.03
Single-level surgery	2.2	1.0 – 4.8	0.048

Discussion:-

This multi-centre study evaluated the outcomes of lumbar spine surgery performed under spinal anaesthesia in a large Nigerian cohort. The findings demonstrate that SA is associated with significant pain relief, functional improvement, short hospital stay, low opioid requirement, and favourable return-to-work and sexual satisfaction rates. The significant reduction in VAS (7.6 to 2.8) and ODI (58.4 to 26.8) at 6-month follow-up is consistent with findings from previous studies. A study from the West African College of Surgeons reported statistically significant satisfactory outcomes using the Oswestry scoring system in patients undergoing non-instrumented lumbar spine surgery under SA, with no mortalities (7). Another Nigerian study found that SA offered a better early postoperative recovery profile than GA, with significantly lower pain scores at 4 hours postoperatively (8). The ODI improvement of 31.6 points exceeds the minimal clinically important difference (MCID) of 12.8 points for lumbar spine surgery, indicating clinically meaningful functional recovery (13).

The mean length of hospital stay of 4.2 days is shorter than the 5–7 days typically reported for lumbar spine surgery under GA in similar settings (14). This is consistent with findings from an umbrella review that identified reduced length of stay as a potential advantage of SA (4). The low rate of postoperative opioid use (12.1%) is notable, particularly given the opioid crisis and the emphasis on multimodal analgesia. A prospective comparative study found that at 24 hours, eight GA patients required additional analgesia versus none in the SA group ($p=0.003$), highlighting the superior analgesic profile of SA (10). The return-to-work rate of 78.0% compares favourably with rates of 60–70% reported in studies of lumbar spine surgery under GA (16). This may reflect the faster recovery and reduced postoperative pain associated with SA. The sexual satisfaction rate of 68.5% is consistent with previous studies reporting that 60–75% of patients experience improvement in sexual function after lumbar spine surgery (17). The lower rates observed in fusion patients (55.6%) compared with discectomy (75.5%) reflect the greater surgical morbidity associated with fusion procedures.

The mortality rate of 0.9% is comparable to rates reported in high-income countries (0.5–1.5%) for lumbar spine surgery (17). Both deaths occurred in fusion patients with significant comorbidities, highlighting the importance of careful patient selection. The complication rate of 7.8%, including dural tear (3.0%) and post-dural puncture headache (2.2%), is consistent with rates reported in the literature for SA (7,18). No neurological deficits or epidural haematomas occurred, confirming the safety of SA in this setting. The identification of age <60 years, absence of comorbidities, discectomy procedure, and single-level surgery as independent predictors of favourable outcome provides useful guidance for patient selection. These factors are consistent with the literature and reflect the lower surgical complexity and better physiological reserve in younger, healthier patients with less extensive procedures (19). In resource-limited settings where SA is particularly advantageous, these predictors can help clinicians identify patients most likely to benefit from this approach (6).

While this study did not include a GA comparison group, the findings are consistent with comparative studies. A systematic review and meta-analysis found that awake surgery under SA was associated with shorter surgery duration and lower risk of postoperative complications, including nausea and vomiting, compared with GA (9). An umbrella review concluded that SA offers potential advantages including shorter operative time, reduced length of stay, lower intraoperative blood loss, and lower postoperative analgesic requirements, while finding no consistent differences in haemodynamic events or overall complications (4). A matched cohort study of TLIF patients found that SA provided significant economic advantages over GA while yielding comparable clinical outcomes (20). This study has several strengths, including a large sample size (n=232) and multi-centre design, which enhances generalizability. Comprehensive outcome assessment across multiple domains provides a holistic view of patient recovery. However, there are limitations. The retrospective design introduces selection and information bias. The absence of a GA comparison group limits the ability to directly compare outcomes between anaesthetic techniques. Outcome assessment at 6 months may not capture longer-term functional recovery. Future prospective, randomised studies comparing SA and GA in the Nigerian setting are warranted.

In conclusion, lumbar spine surgery under spinal anaesthesia is associated with significant pain relief, functional improvement, short hospital stay, low opioid requirement, and favourable return-to-work and sexual satisfaction rates in this Nigerian multi-centre cohort. The mortality rate of 0.9% and complication rate of 7.8% are acceptable. Age <60 years, absence of comorbidities, discectomy procedure, and single-level surgery are independent predictors of favourable outcome. Spinal anaesthesia is a safe and effective alternative to general anaesthesia in carefully selected patients undergoing lumbar spine surgery in resource-limited settings.

References:-

1. Deyo RA, Mirza SK, Martin BI, Kreuter W, Goodman DC, Jarvik JG. Trends, major medical complications, and charges associated with surgery for lumbar spinal stenosis in older adults. JAMA. 2010;303(13):1259-65.
2. Martin BI, Mirza SK, Spina N, Spiker WR, Lawrence B, Brodke DS. Trends in lumbar fusion procedure rates and associated hospital costs for degenerative spinal diseases in the United States, 2004 to 2015. Spine. 2019;44(5):369-76.
3. Obinna OH, Noel NI, Sylvester EO, Chisom OR. Spinal anaesthesia in non-instrumented lumbar spine surgery: does it work? J West Afr Coll Surg. 2026;16(2):151-3.
4. Ononogbu-Uche FC, Tella C, Sharma A, et al. Reconsidering anesthesia in lumbar surgery: an umbrella review of awake versus general anesthesia. J Clin Med. 2025;14(23):8335.
5. Finsterwald M, Muster M, Farshad M, Saporito A, Brada M, Aguirre JA. Spinal versus general anesthesia for lumbar spine surgery in highrisk patients: perioperative hemodynamic stability, complications and costs. J Clin Anesth. 2018;46:3-7.
6. Muzien SJ. A protocol for lumbar spine surgery under spinal anesthesia in resource limited countries: illustrative case series. Ann Med Surg (Lond). 2025;87(1):49-55.
7. Kawu AA, Abubakar K, Nurudeen AM, Garko MS. Spinal anaesthesia in lumbar spinal surgery in Abuja, Nigeria. J Med Health Sci. 2021; 3(7):1115-1118
8. Ozor C, Anokwute I, Odiakosa M, Ajuzieogu O, Iyidobi E, Okeke I. Postoperative recovery profile following posterior lumbar laminectomy: a comparative study of general anaesthesia and spinal anaesthesia. Niger J Anaesth. 2025;2(2):87-93.
9. Weber CF, Früh A, Jelgersma C, Almahozi A, Ferdowssian K, Hecht N, et al. Systematic review and meta-analysis of spinal versus general anesthesia in decompressive surgeries of the lumbar spine. Brain Spine. 2025;5:104280.
10. Al-Awwady AN, Kareem HK, Mohammed AJ. Comparison of intra-operative and postoperative outcomes after general versus spinal anaesthesia in lumbar spine surgeries: a prospective comparative study. Babcock Univ Med J. 2026;9(2):311-7.
11. Ajao OG, Adeloye A. The importance of spinal anaesthesia in surgical practice in tropical Africa. J Trop Med Hyg. 1977 Jun;80(6):126-8
12. Adebayo OK, Koleosho-Ademua O, Morhason-Bello JO,Allen-Taylor A. Patterns of anaesthesia in orthopaedic and trauma surgery in secondary health care centre in South-Western Nigeria: a retrospective audit. AMMS. 2025; 4(13): 1407 - 13.
13. Copay AG, Glassman SD, Subach BR, Berven S, Schuler TC, Carreon LY. Minimum clinically important difference in lumbar spine surgery patients: a choice of methods using the Oswestry Disability Index. Spine J. 2008;8(6):968-74.
14. Rajjoub R, Ghaith AK, El-Hajj VG, Rios-Zermano J, De Biase G, Atallah E, et al.Comparative outcomes of awake spine surgery under spinal versus general anesthesia: a comprehensive systematic review and meta-analysis. Eur Spine J. 2024 Mar;33(3):985-1000
15. Sekerak R, Mostafa E, Morris MT, Nessim A, Vira A, Sharan A. Comparative outcome analysis of spinal anesthesia versus general anesthesia in lumbar fusion surgery. J Clin Orthop Trauma. 2021;13:122-6.
16. Malik AT, Jain N, Kim J, Khan SN, Yu E. Sexual activity after spine surgery: a systematic review. Eur Spine J. 2018;27(10):2395-404.
17. Kalanithi PA, Arrigo R, Boakye M. Operative time and complications in spine surgery. J Neurosurg Spine. 2014;21(2):219-25.
18. Ahmed Jonayed S, Alam MS, Al Mamun Choudhury A, Akter S, Chakraborty S. Efficacy, safety, and reliability of surgery on the lumbar spine under general versus spinal anesthesia- an analysis of 64 cases. J Clin Orthop Trauma. 2021 Jan 8;16:176-181..
19. Lee MJ, Konodi MA, Cizik AM, Bransford RJ, Bellabarba C, Chapman JR. Risk factors for medical complication after spine surgery. Spine J. 2013;13(9):1060-7.
20. Ononogbu-Uche FC, Saleh AW, Toussaint F, Wallace T, Woo J, Morris MT, et al. Spinal Anesthesia Results in Lower Costs Compared to General Anesthesia for Patients Undergoing Lumbar Fusion-A Matched Cohort Study. J Clin Med. 2025;14(11):3851