Nigerian Medical Journal
NIGERIA MEDICAL ASSOCIATION
Print ISSN 0300-1652, E-ISSN 2229-774X

Original Article

Caesarean Section Techniques among Senior Obstetricians in Nigeria: A Descriptive Multicentre Survey

Gabriel Dogbanya[1], *Samuel Okwuchukwu Ilikannu[2], Sunday Emmanuel Jombo[2], Zaro Boysungni[3], Stephen Ajani[4], Yahya Anisa[5], Festus Ogudugu[5], Ekeng Offiong[6], Odigonma Zinobia Ikpeze[7], Chidinma Ohachenu[8], Nnamdi Pascal Okoye[2], Ngozi Roy Maduka[9], Suraiya Suleiman Auwal[10], Odeniyi Anthony Odeyemi[11], William Amebeobari Mube[12], Patrick Olufemi Kudaisi[13], Monica Isoken Aikpokpo[14], Patrick Nwabunor Osifo[2], Kenechukwu Ezekwesili Obi[7], Olabiyi Hezekiah Olaniran[15]

[1] Department of Family Science, University of Maryland, College Park. MD, USA, [2] Department of Obstetrics and Gynaecology, Federal Medical Centre, Asaba, Delta State, Nigeria, [3] Department of Obstetrics and Gynaecology, Federal Teaching Hospital, Dutse, Jigawa State, Nigeria, [4] Department of Obstetrics and Gynaecology, Deda Hospital, Katampe, Abuja, Nigeria, [5] Department of Obstetrics and Gynaecology, Ahmadu Bello University Teaching Hospital, Kaduna State, Nigeria, [6] Department of Anaesthesia, Nile University, Abuja, Nigeria, [7] Department of Obstetrics and Gynaecology, Nnamdi Azikiwe University Teaching Hospital, Nnewi, Anambra State, [8] Department of Obstetrics and Gynaecology, Korle Bu Teaching Hospital, Accra, Ghana, [9] Department of Obstetrics and Gynaecology, Central Hospital Agbor, Delta State, Nigeria, [10] Department of Obstetrics and Gynaecology, National Hospital, Abuja, Nigeria, [11] Department of Obstetrics and Gynaecology, Federal Teaching Hospital, Lokoja, Kogi State, Nigeria, [12] Department of Obstetrics and Gynaecology, Madonna University, Elele, Rivers State, Nigeria, [13] Prince Charles Hospital, Merthyr Tydfil, Wales, United Kingdom, [14] Department of Obstetrics and Gynaecology, Irrua Specialist Teaching Hospital, Edo State, Nigeria, [15] Vascular and Endovascular Surgery Department, Beth Israel Deaconess Medical Centre, Harvard Medical School Teaching Hospital, Boston, MA, USA.

Abstract

Background: Caesarean section (CS) is one of the most commonly performed surgical procedures worldwide, yet considerable variation exists in operative techniques, particularly in low and middle-income countries. The aim of this study is to determine the common surgical techniques employed by senior obstetricians in Nigeria and evaluate the associations with demographic and institutional factors.

Methods: A descriptive cross-sectional multicentre online survey was conducted between May 2023 and May 2024 among practising Senior Registrars and Consultants in Obstetrics and Gynaecology across Nigeria. Using a structured, pretested questionnaire, data were collected on sociodemographic characteristics, preoperative, intraoperative, and postoperative CS practices. Data were analysed using R statistical software, with descriptive statistics and multivariate analyses performed. Statistical significance was set at $p < 0.05$.

Results: A total of 293 complete responses were analysed. The mean age of respondents was 42.1±7.6 years, with a mean work experience of 11.9±6.4 years; 66.6% were male, and 78.8% practiced in federal tertiary hospitals. The most commonly reported techniques included skin preparation with Savlon plus alcohol (73.4%), Pfannenstiel abdominal incision (71.0%), bladder flap creation (73%), controlled cord traction for placental delivery (68.9%), double-layer uterine closure (99%), visceral peritoneal closure (60%), and subcuticular skin closure (96.6%). Routine postoperative thromboprophylaxis was used by only 18.4% of respondents. Most surgical choices were not significantly associated with age, work experience, or place of practice, except for visceral peritoneal closure, which varied by institution ($p = 0.043$).

Conclusion: CS practices among obstetricians in Nigeria showed some consistency in key operative steps such as Pfannenstiel incision, double-layer uterine closure, and subcuticular skin closure, alongside notable variation in other aspects, particularly thromboprophylaxis use. These findings highlight the influence of institutional practice patterns and underscore the need for context-specific, evidence-based guidelines to harmonise CS techniques and optimise maternal outcomes nationwide.

Keywords: Caesarean Section, Surgical Techniques, Obstetrician, Maternal Health.

***Correspondence:** Dr Samuel Okwuchukwu Ilikannu. Department of Obstetrics and Gynaecology, Federal Medical Centre, Asaba, Delta State, Nigeria. Email: dr.ilikannu@gmail.com. Phone: +2348038411984

How to Cite: Dogbanya G, Ilikannu SO, Jombo SE, Boysungni Z, Ajani S, Yahya A, et al. Caesarean section techniques among senior obstetricians in Nigeria: A descriptive Multicentre Survey. Niger Med J 2026;67(2): 3058-3069. https://doi.org/10.71480/nmj.v67i2.1332

Quick Response Code:

Introduction

Caesarean section is an essential maternal healthcare service, and its role in labour and delivery care in low- and middle-income countries is complex.[1] It is a commonly performed major abdominal surgery in women around the world.[2,3,4] Global rates are unknown, and it is estimated at 10%, with about 13 million CS performed each year.[5] The rates vary between countries and hospital settings, ranging from 2.7% in developing countries such as Nigeria to 20–25% in developed countries.[6,7] In Sub-Saharan Africa, other reported rates vary from 3% in Burkina Faso to 15.6% in government-owned hospitals in Ghana; while rates in private healthcare settings range from 0% in Sao Tome and Principe to 64.2% in Rwanda.[8] Although caesarean section rate of 10–15% has been deemed optimum,[9] it is mostly undertaken on medical grounds and not focused on achieving a specific rate.[10]

Reports show maternal indications constituted 68%, whereas fetal indications accounted for 32%, with cephalopelvic disproportion (CPD) (38.1%), previous CS (18.9%), fetal distress (12.5%), mal-presentation and malposition (7.1%), and antepartum haemorrhage (APH) (6%), accounting for 82.6% of the indications for caesarean section in our setting.[11] Fetal indications include fetal distress (9.6%), breech presentation (4.7%), fetal macrosomia (4.3%), and pregnancy complicated by multiple fetuses (4.2%).[12]

Over the years, numerous variations in the technique of caesarean section have been developed and are currently in use.[13,14,15] The techniques employed depend on various factors, including the clinical situation and the surgeon's preferences.[14] It is, however, important that CS operations are performed as safely and effectively as possible and follow methodologically rigorous and sound techniques backed by evidence [16] because small variations in surgical techniques could have a significant impact on a global scale.[17]

The absence of standardised, evidence-based guidelines for CS results in variations in what is considered best practice.[18] Intra-operative differences include blunt versus sharp abdominal entry, single versus double-layer uterine closure, closure versus non-closure of the peritoneum, and use of polyglactin sutures over chromic catgut.[18] This informed the CORONIS trial, an international multicenter, randomized controlled trial on the CS technique, by the CORONIS collaborative group of researchers, who reported the short-term outcomes at 6 weeks post-delivery in 2013, in which it found no clear benefits between single versus double layer closure of the uterus, closure versus non-closure of the peritoneum, and chromic catgut versus polyglactin-910 for uterine repair among other findings. Their study involved 15,935 women in low-income and middle-income countries.[18] The primary outcomes follow-up study also found no significant differences in long-term outcomes such as pelvic pain, deep dyspareunia, incisional hernia, intra-abdominal adhesions and outcomes of subsequent pregnancies.[19] Hofmeyr and colleagues, in a meta-analysis of randomised controlled trials, compared the outcomes of various complete CS techniques. They found that the Joel-Cohen–based approach, when compared to the traditional Pfannenstiel technique, was associated with significantly reduced blood loss, shorter operating time, earlier return to oral intake, lower incidence of fever, decreased postoperative pain, fewer analgesic injections, and a shorter interval from skin incision to delivery of the baby. Similarly, the Misgav-Ladach technique was associated with reduced blood loss, shorter operating time, faster mobilisation, and a shorter duration of postoperative hospital stay when compared to traditional methods.[20] In a related study on methods of placental delivery during CS, Anorlu and colleagues reported that controlled cord traction provided more benefits than manual removal, including a lower risk of endometritis, reduced blood loss, less postoperative hematocrit decline, and a shorter hospital stay.[21]

In a study conducted among 258 Obstetricians and Gynaecologists in Ethiopia, Gudu and colleagues reported that 98.4% of respondents performed double-layer closure of the uterine incision, while 96.4% used subcuticular closure for the skin.[22] Similarly, Asah-Opoku and colleagues observed 493 different combinations of caesarean section techniques in an observation of 1,013 primary caesarean deliveries at a tertiary hospital in Ghana. Their findings showed that a low transverse uterine incision was used in 98% of

cases. Additionally, 90.4% of women had double-layer uterine closure, 94.9% had uterine exteriorization for repair, 37.7% had the peritoneum closed, 64.7% had the rectus muscle left unclosed, 66.8% had subcutaneous tissue closure, and 97.0% had skin closure using subcuticular sutures.[17]

Nigeria faces a significant shortage of registered Obstetricians and Gynaecologists relative to its large population. A study by Agboghoroma et al. reported a total of only 968 Obstetricians and Gynaecologists in the country, with 87.4% being male and just 12.6% female. The southwest geopolitical zone accounted for the highest proportion (32.5%), with Lagos state representing 18.5%. In contrast, Yobe state in the Northeast of Nigeria had only 0.2%.[23]

As CS rates continue to rise, even modest differences in postoperative outcomes between surgical techniques may have substantial implications for a large number of women.[1] This underscores the importance of evaluating and understanding the techniques in use. The present study aimed to explore the common caesarean section techniques employed by Obstetricians in Nigeria. While several studies have examined caesarean section practices, particularly with respect to auditing indications [1], few have focused specifically on reviewing the surgical techniques themselves, especially in the context of ongoing medical and technological advancements.

Methodology

Study Design: This was a descriptive, multicentre survey conducted online among Obstetricians from the cadre of senior registrars across the major hospitals (private, federal and state) in Nigeria between 1st May 2023 and 1st May 2024.

Inclusion and Exclusion Criteria: Eligible participants were currently practising obstetricians, senior registrars, and consultants who gave consent. Registrars, medical officers, and senior obstetricians who no longer practice were excluded from the study. Incomplete responses and incomplete data were not analysed.

Sample Size Determination

The Raosoft sample size calculator (Seattle, WA: Raosoft, Inc.),[24] was used to ensure the recruitment of a sufficiently large number of study participants to obtain statistically significant data. With a 5% error margin, 95% confidence interval and a population size of 20,000 (arbitrarily chosen by the app for an undetermined sample population). This gave an uncorrected sample size of 377 Participants.

Since the number of Obstetricians and Gynaecologists in a previous study was less than 10,000 (968) [23], the following correction formula was used to obtain a corrected sample size:

$$n_c = \frac{nPt}{n+(Pt-1)}$$

Where n is the uncorrected sample size, Pt is the total population of obstetricians.

$$n_c = \frac{377 \times 968}{377 + (968-1)} = 272$$

Assuming a non-response rate of 10%, the required sample size increased by 10% to 298, thus a total of approximately 300 obstetricians were sampled.

Sampling and Data Collection

The study participants were recruited using non-probability sampling methods- convenience and snowball sampling techniques. It was an open survey. The questionnaire was adapted from similar studies and was also reviewed by some senior obstetricians and examiners in the faculty of Obstetrics and Gynaecology of both the National Postgraduate College of Medicine and the West Africa College of Surgeons to ensure the validity of the study tool. A small pilot administration of the study tool was given to thirty obstetricians practising in Delta State before the commencement of the study, and their comments and feedback revealed no ambiguity. Cronbach's alpha tests were also run after the full data collection to evaluate the internal consistency of scales, with values >0.7 indicating good reliability. The well-structured, self-administered questionnaire was developed on the Kobo toolbox, a digital data collection tool. The questionnaire had four sections – Sociodemographic characteristics, Preoperative, Intraoperative and Post-operative practices. The survey was distributed via various social media channels, including WhatsApp, X (formerly Twitter), Facebook, Instagram, and email. Participation was voluntary. The investigators' purpose of study and average duration of response (5minutes) were specified. Informed consent was required before accessing the form. Personal information was not collected, and confidentiality was strictly maintained. There were no incentives, and individuals who did not provide consent were unable to participate. The questionnaire was available at all times of the day during the duration of the study, and there was no provision for reviewing responses once submitted. The study mostly followed the recommended checklist for reporting results of internet e-surveys (CHERRIES) protocol to ensure quality in online data collection.[25]

Data Management and Analysis: Data collected via the Kobo toolbox were exported to Microsoft Excel, and complete responses were subsequently analysed using R statistical software version 4.4.2. Both descriptive and inferential statistical analyses were performed, with findings presented in tables and figures.

Result

There were 293 complete responses, a completion rate of 97.7%. The mean age and work experience of respondents were 42 years and 11.9 years, respectively. One-third of the practitioners were female, and two-thirds were male. Most of the respondents practice in federal tertiary (teaching) hospitals. The south-south had the largest representation and the north-east the least (Table 1).

Table 1. Mean Age and work experience

Variable	Mean (years)	Sd	Number(n=293)	Percentage
Age	42.1	7.55		
Work Experience	11.9	6.43		
Gender				
Male			195	66.6
Female			98	33.4
Practicing Hospital				
Federal Tertiary Hospital			228	78.8
State Tertiary Hospital			25	8.5
Private Hospital			24	8.2
Federal Secondary Hospital			3	1.0
State Secondary Hospital			13	4.4
Geopolitical zone of practice				

South-West	40	13.7
South-East	49	16.7
South-South	78	26.6
North-Central	67	22.8
North-West	45	15.4
North-East	14	4.8

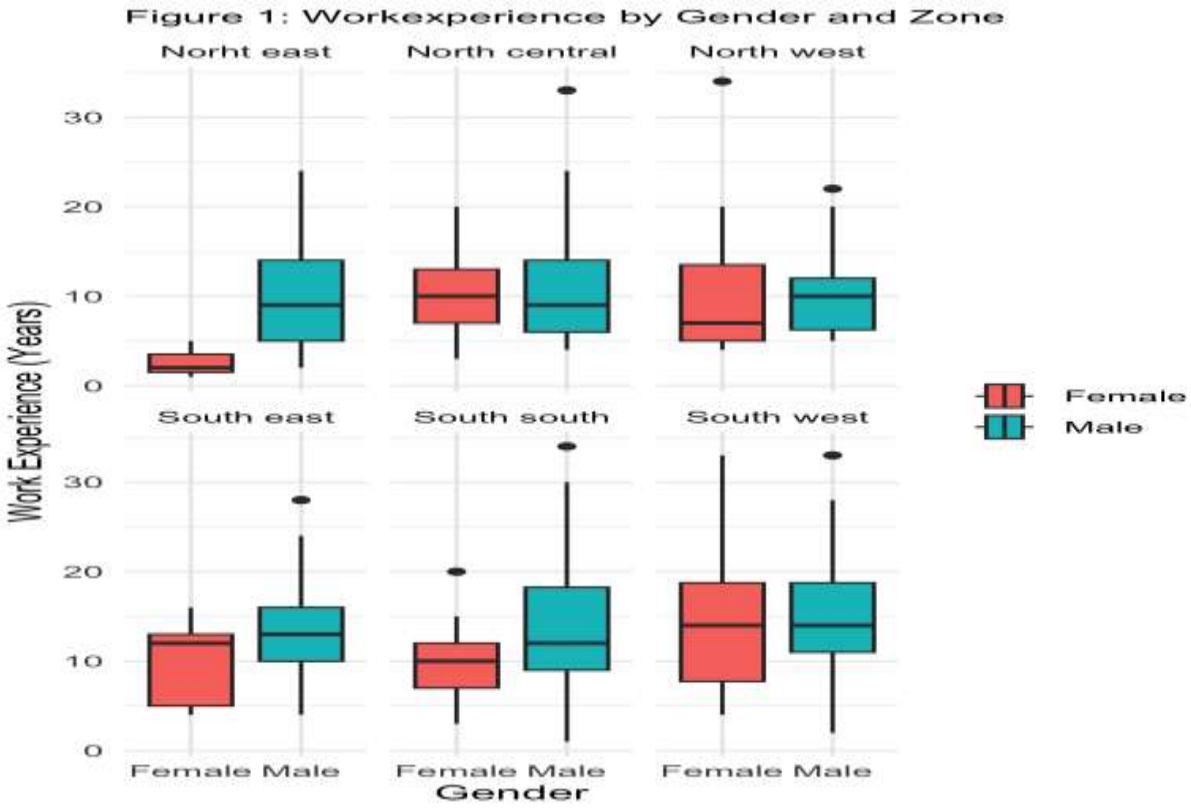
Savlon with alcohol was commonly used for skin preparation, and the common mode of abdominal skin incision was Pfannenstiel. Placental delivery was via controlled cord traction in most cases. Uterine closure was double-layered in 99%, while visceral peritoneum was closed by 60%. Routine post-operative thromboprophylaxis was used by only 18.4% (Table 2).

Table 2: Common techniques used.

Variable	**Category**	**Number(n=293)**	**Percent**
Skin Preparation	Savlon +Alcohol	215	73.4
	Povidon iodine +Alcohol	40	13.6
	Savlon + Povidone iodine	38	13.0
Abdominal Skin Incision	Joel Cohen	32	10.9
	Pfannenstiel	208	71.0
	Mixed	52	17.8
	Midline	1	0.3
Bladder Flap creation	Yes	214	73
	No	79	27
Placental Delivery	Control cord traction	202	68.9
	Manual	78	26.6
	Mixed	13	4.4
Uterine Closure	Double layer	290	99
	Single layer	3	1
Visceral Peritoneal Closure	Yes	176	60
	No	117	40
Abdominal skin closure	Subcuticular	283	96.6

	Others	10	3.4
Routine Thromboprophylaxis Use	Yes	54	18.4
	No	239	81.6

In most regions, male practitioners had a slightly higher median number of years in practice compared to females. The South-West zone shows the highest median work experience for both genders, while the North-East reflects the lowest, as seen in Fig 1.



Most procedural choices, such as abdominal skin incision, placenta delivery and uterine closure, did not significantly vary by either work experience or place of practice. There was, however, a significant relationship between place of practice and visceral peritoneum closure, p=0.043. Age and work experience also showed a strong and statistically significant association (Table 3).

Table 3: Bivariate Analysis of Factors Associated with Cesarean Section Surgical Practices

Variable Pair	P value
Work Experience vs Abdominal Incision	0.504*
Work Experience vs visceral peritoneal closure	0.266*

Age vs Work experience.	<0.001*
Place of practice vs. Uterine Incision closure	0.930**
Place of Practice vs Placenta Delivery	0.408**
Place of practice vs. Visceral peritoneum closure	0.043**

Footnote: Analysis *t-test, ** Chi-square test.

No statistically significant associations were found between age or work experience and preference for either Savlon + Alcohol or Povidone Iodine + Alcohol as skin preparation methods. There was a marginal trend which suggests that older practitioners may be slightly more inclined to use Savlon + Alcohol, but the association did not reach statistical significance ($p = 0.07$) as seen in Table 4a. No significant association was found between bladder flap creation and demographic factors or place of practice (*all* $p > 0.05$). Male practitioners were slightly less likely to create a bladder flap than females, but the result was not statistically significant. A slight, non-significant increase in likelihood with more years of experience, but it was not statistically significant. There was no significant association between visceral peritoneal closure and demographic or institutional factors assessed were (*all* $p > 0.05$) (Table 4b).

Table 4a: Factors Associated with Skin Preparation Method

Predictor	Skin Preparation choice	OR(95%CI)	P value
Surgeons Age	(Savlon + Alcohol)	1.07(0.995 – 1.15)	0.07
Surgeons Age	(Povidone Iodine + Alcohol)	1.03(0.94 – 1.13)	0.52
Work experience	(Savlon + Alcohol)	0.99(0.90 – 1.08)	0.77
Work experience	(Povidone Iodine + Alcohol)	1.03(0.92 – 1.15)	0.65

Table 4b Multivariate Analysis of Factors Associated with Surgical Techniques

Predictor	Procedure	OR(95%CI)	P value
Surgeons Age	Bladder Flap	1.01(0.97 – 1.05)	0.67
Surgeons Age	Peritoneal Closure	0.99(0.95 – 1.05)	0.91
Gender	Bladder Flap	0.83(0.46 – 1.47)	0.53
Gender	Peritoneal Closure	0.97(0.17-1.63)	0.53
Work experience	Bladder Flap	1.02(0.97-1.08)	0.35

Work experience	Peritoneal Closure	0.99(0.94-1.04)	0.68
Hospital type	Bladder Flap	0.68(0.03 – 8.04)	0.76
Hospital type	Peritoneal Closure	0.83(0.04-0.99)	0.81

Significant predictors of reduced thromboprophylaxis use were federal tertiary hospitals (*OR = 0.09*, *p = 0.05*) and State secondary hospitals (*OR = 0.04*, *p = 0.04*). Male gender is borderline significant with lower odds of use (*p = 0.05*). Age and work experience show no significant relationship with routine thromboprophylaxis use (Table 5).

Table 5: Association Between Routine Thromboprophylaxis Use and Demographic/Institutional Factors

	OR	CI	P value
Male Gender	0.53	0.272 -1.01	0.05
Age	1.01	0.969 -1.05	0.67
Work Experience	1.02	0.973 -1.08	0.35
Private hospital	0.30	0.012- 3.72	0.36
Federal Tertiary Hospital	0.09	0.0043 - 0.993	0.05
State Tertiary	0.13	0.005 -1.63	0.12
State Secondary Hospital	0.04	0.0008-0.79	0.04

Discussion

This study highlights the diverse surgical techniques employed by Obstetricians in Nigeria during caesarean deliveries. It also offers insight into the demographic and geographic distribution of practitioners. With a mean age of 42.1 years and an average of 11.9 years of clinical experience, most respondents were practising in federal tertiary (teaching) hospitals. Notably, two-thirds were male, and one-third were female. The South-South region had the highest number of responses, while the North-East had the least. Our findings support the earlier report by Agboghoroma et al., who documented a male-dominated workforce in Nigerian Obstetrics and Gynaecology practice (87.4% male vs 12.6% female), and similarly noted a shortage of practitioners in the North-East.[23] However, while Agboghoroma found the South-West to have the highest number of specialist obstetricians and gynaecologists, our study found that the South-West had the highest **median work experience** for both genders.

Regarding common surgical techniques at caesarean section, we found the combination of **Savlon (Chlorhexidine) and alcohol** as the most common method for skin preparation in Nigeria (73.4%). This differs from findings in Ethiopia, where **alcohol and iodine** were predominantly used, as reported by Gudu et al.[22] For abdominal skin incisions, the **Pfannenstiel incision** was overwhelmingly preferred (70.9%), with the **Joel-Cohen incision** used in only 10.9% of cases. This aligns with trends seen across Africa and beyond. For instance, Gudu et al. reported 94.8% usage of Pfannenstiel [22] while Asah-Opoku in Ghana

recorded 98%.[17] In the UK, Tully et al. found over 80% usage of Pfannenstiel for elective caesarean sections, although Joel-Cohen was more common (32.7%) during emergencies.[15] Franchi et al. also found Joel-Cohen incisions to offer faster opening and operating times in a study comparing Joel-Cohen to Pfannenstiel.[26]

A significant proportion of practitioners (73%) in our study routinely created a **bladder flap**, compared to 42.2% in the Ethiopian study by Gudu et al.[22] **Controlled cord traction** was the dominant method for placental delivery (68.9%), while **manual removal** was used in 26.6%. This echoes the 92.8% preference for controlled traction in Gudu's findings.[22] This preference is likely informed by research such as the findings of Anorlu et al., which linked manual removal with higher rates of endometritis, blood loss, anaemia, and prolonged hospital stays.[21] Uterine closure was performed with a **double-layer technique** in nearly all cases (99%), consistent with high rates seen in Ethiopia (98.4% by Gudu et al), Ghana (90.4% by Asah-Opoku et al),[17] the UK (80% by Tully et al.),[15] and the US (73.3% by Lyell et al).[27] Similarly, **visceral peritoneum closure** was practised by 60% of Nigerian respondents, higher than the 37.7% reported in Ghana[17] and 39.8% in Ethiopia.[22] Lyell et al. [27] in the US also noted a split between frequent (42.5%) and infrequent (49.9%) visceral peritoneum closure. For **abdominal skin closure**, the **subcuticular technique** dominated (96.6%), mirroring the 97% reported in Ghana by Asah-Opoku et al.[17]

Pregnant and postpartum women are at an increased risk of venous thromboembolism, with a variety of modalities available for reducing the risk of post-caesarean delivery thromboembolic disease.[28] These include mechanical methods (graduated compression stockings, intermittent pneumatic compression) and pharmacological methods (unfractionated heparin and low molecular weight heparin).[28] A Cochrane review that assessed the efficacy of some strategies for post-caesarean delivery thromboprophylaxis that compared heparin (either LMWH or unfractionated heparin) with placebo/no treatment revealed no differences in symptomatic thromboembolic events, symptomatic pulmonary embolism or symptomatic deep vein thrombosis.[29] The enhanced recovery after surgery (ERAS) guideline for caesarean section recommended the use of pneumatic compression stockings to prevent thromboembolic disease in patients who undergo caesarean delivery, and does not recommend the routine use of heparin for VTE prophylaxis in patients after caesarean delivery. According to the guideline, chemoprophylaxis should be for those at high risk of thromboembolism. The routine use of **thromboprophylaxis** at caesarean delivery, be it for high-risk mothers or the general population, was notably low in our study (18.4%) compared to 51.4% in government teaching hospitals in Ethiopia.[22] This finding may be due to the results of previous studies that did not find a significant difference in its use and due to the cost of procuring the drugs, as most of our patients pay out of pocket as a result of our limited national health insurance coverage.

Overall, this study reinforces but aligns with regional and international variations in caesarean section techniques as highlighted by Hofmeyr et al. in their comprehensive review on caesarean section techniques.[20] While surgical approaches to caesarean delivery vary widely, documenting and understanding these differences is essential for improving outcomes and guiding policy development in maternal care.

The limitations of this study will include being an online study, which allows only those with digital literacy and/or having data connectivity to participate, the non-probability sampling technique deployed, which may have allowed some selection bias and the cross-sectional study design of this study, which cannot establish causality. Also, this study may have also been subjected to other forms of biases, including recall bias, non-response bias and self-report bias by the respondents. In addition, worked in a federal tertiary institution. The findings are, however, strengthened as the study was able to garner responses from obstetricians and gynaecologists practising at different centres all over the country.

Conclusion

This study provides an overview of caesarean section practices among obstetricians in Nigeria, revealing both similarities and differences compared to regional and international trends. While Pfannenstiel incision, double-layer uterine closure, and subcuticular skin closure remain predominant, variations exist in skin preparation, placental delivery methods, visceral peritoneum closure, and use of thromboprophylaxis. These findings highlight the influence of local training, resource availability, and institutional preferences on surgical choices. The demographic and geographic disparities observed, particularly the male-dominated workforce and uneven regional distribution of practitioners, underscore the need for targeted workforce development, especially in underrepresented zones like the North-East. Documenting these patterns is vital for informing evidence-based guidelines, harmonizing surgical techniques, and ultimately improving maternal outcomes across Nigeria.

Ethical Consideration: Ethical approval was obtained from the Research and Ethics Committee of the Federal Medical Centre, Asaba, before the commencement of the study in conformity with the Helsinki declaration, with emphasis on the core ethical principles of autonomy, beneficence, non-maleficence and justice, with approval number FMC/ASB/A81 VOL.XII/432 dated May 1st 2023.

Consent to Participate and Consent for Publication: The respondents gave their informed consent to participate in this survey and also gave their express approval to have their responses published for academic purposes.

Authors Contribution

G.D, S.O.I: Conceptualisation and study design, writing original draft, data collection, data analysis, and interpretation, drafting and critical review for intellectual content.

S.E.J, Z.B, S.A, Y.A, F.O, E.O, O.Z.I, C.O, N.P.O, N.R.M, S.S.A, O.A.O, W.A.M, P.O.K, M.I.A, P.N.O, K.E.O, O.H.O: Data collection, data interpretation and analysis, drafting and critical review for intellectual content.

All authors gave their consent for the final version to be published and agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Funding

The authors received no financial support.

Data Availability

The datasets used and/or analysed during this study are available upon reasonable request from the corresponding author.

Acknowledgement

We wish to thank all who accepted participation in this study, despite their overwhelming schedules.

References

1. Harrison MS, Goldenberg RL. Cesarean section in sub-Saharan Africa. Maternal Health, Neonatology, and Perinatology. 2016 2:6. Available online @ https://doi:10.1186/s40748-016-0033-x.
2. Jombo S, Ossai C, Onwusulu D, Ilikannu S, Fagbemi A. Feto-maternal outcomes of caesarean delivery in Federal Medical Centre Asaba: A two-year review. African Health Sciences 2022; 22(1): 172-179. Available online @ https://doi:10.4314/ahs.v22i1.22.

3. Dumont A, de Bernis L, Bouvier-Colle MH, Breart G. MOMA study group. Caesarean section rate for maternal indication in sub-Saharan Africa: a systematic review. Lancet 2001; 358(9290):1328-33. Available online @ https://doi:10.1016/s0140-6736(01)06414-5.
4. Pai M, Sundaram P, Radhakrishnan KK, Thomas K, Muliyil JP. A high rate of caesarean sections in an affluent section of Chennai: is it cause for concern? National Medical Journal of India 1999; 12(4):156-8.
5. The CAESAR study collaborative group. Caesarean section surgical techniques: a randomised factorial trial (CAESAR). BJOG 2010; 117(11):1366–1376. Available online @ https://doi:10.1111/j.1471-0528.2010.02686.x.
6. Thomas J, Paranjothy S. Royal College of Obstetricians and Gynaecologists Clinical Effectiveness Support Unit. National Sentinel Caesarean Section Audit Report. RCOG Press; 2001.
7. Berglundh S, Benova L, Olisaekee G, Hanson C. Caesarean section rate in Nigeria between 2013 and 2018 by obstetric risk and socio-economic status. Trop Med Int Health. 2021;26(7):775-788. Available online @ https://doi: 10.1111/tmi. 13579.
8. Yaya S, Uthman OA, Amouzou A, Bishwajit G. Disparities in caesarean section prevalence and determinants across sub-Saharan African countries. Glob Health Res Policy 2018;3:19. Available online @ https://doi:10.1186/s41256-018-0074-y.
9. Betran AP, Torloni MR, Zhang J, Ye J, Mikolajczyk R, Deneux-Tharaux C, et al. What is the optimal rate of caesarean section at population level? A systematic review of ecologic studies. Reprod Health 2015; 12: 57. Available online @ https://doi:10.1186/s12978-015-0043-6.
10. Betran AP, Torloni MR, Zhang JJ, Gulmezoglu AM for the WHO working Group on Caesarean Section. WHO statement on caesarean section rates. BJOG 2015; 123(5):667-670. Available online @ https://doi.org/10.1111/1471-0528.13526.
11. Moges A, Ademe BW, Akessa GM. Prevalence and Outcome of Caesarean Section in AttatHospital, Gurage Zone, SNNPR, Ethiopia. Archives of Medicine. 2015.7; 4:8.
12. Geidam AD, Audu BM, Kawuwa BM, Obed JY. Rising trend and indications of caesarean section at the University of Maiduguri Teaching Hospital, Nigeria. Annals of African Medicine, 2009;8(2):127-132. Available online @ https://doi:10.4103/1596-3519.56242.
13. Buowari YD. Indications for caesarean section at a Nigerian District Hospital. The Nigerian Health Journal.2015;12(2):43. Available online @ https://doi.org/10.60787/tnhj.v12i2.89.
14. Hofmeyr GJ, Mathai M, Shah AN, Novikova N. Techniques for caesarean section. Cochrane Database of Systematic Reviews. 2008(1): CD004662. Available online @ https://doi:10.1002/14651858.CD004662.pub2.
15. Tully L, Gates S, Brocklehurst P, McKenzie-McHarg K, Ayers S. Surgical techniques used during caesarean section operations: results of a national survey of practice in the UK. Eur J Obstet Gynecol Reprod Biol 2002;102(2):120-126. Available online @ https://doi:10.1016/s0301-2115(01)00589-9.
16. CORONIS Trial Collaborative Group. The CORONIS Trial. International study of caesarean section surgical techniques: a randomised fractional, factorial trial. BMC Pregnancy Childbirth 2007;7:24. Available online @ https://doi:10.1186/1471-2393-7-24.
17. Asah-Opoku K, Heesterman T, Zeevaert ML, Agyabeng K, Browne JL, Damale N, et al. Cesarean section: One procedure, varied techniques. Detailed observations of 1013 first cesarean sections in a tertiary hospital in Ghana. Int J Gynecol Obstet. 2025; 169(2):707-719. Available online @ https://doi.org/10.1002/ijgo.16133.
18. CORONIS Collaborative Group; Abalos E, Addo V, Brocklehurst P, El Sheikh M, Farrell B, Gray S, et al. Caesarean section surgical techniques (CORONIS): a fractional, factorial, unmasked, randomised controlled trial. Lancet 2013; 382(9888): 234–48. Available online @ https://doi:10.1016/S0140-6736(13)60441-9.
19. The CORONIS collaborative group. Caesarean section surgical techniques: 3-year follow-up of the CORONIS fractional, factorial, unmasked, randomised controlled trial. Lancet 2016;388(10039):62-72. Available online @ http://doi:10.1016/S0140-6736(16)00204-X.

20. Hofmeyr JG, Novikova N, Mathai M, Shah A. Techniques for cesarean section. Am J Obstet Gynecol. 2009;201(5):431-44. Available online @ https://doi:10.1016/j.ajog.2009.03.018.
21. Anorlu RI, Maholwana B, Hofmeyr GJ. Methods of delivering the placenta at caesarean section. Cochrane Database Syst Rev.2008;16(3): CD004737. Available online @ https://doi:10.1002/14651858.CD004737.
22. Gudu W, Sisay ZT, Wondafrash M, Sium AF. Cesarean delivery surgical techniques in Africa: A survey study from Ethiopia. PLoS ONE. 2023;18(10): e0292382. Available online @ https://doi:10.1371/journal.pone.0292382.
23. Agboghoroma CO, Gharoro EP. Coverage and distribution of obstetricians and gynecologists in Nigeria. International Journal of Gynecology & Obstetrics. 2015; 129(1): 50-53. Available online @ https://doi.org/10.1016/j.ijgo.2014.09.034.
24. Raosoft Inc. Raosoft sample size calculator [Internet]. Seattle (WA): Raosoft Inc.; 2004. Available from: http://www.raosoft.com/samplesize.html.
25. Eysenbach G. Improving the quality of Web surveys: the Checklist for Reporting Results of Internet E-Surveys (CHERRIES). J Med Internet Res. 2004;6(3): e34. Available online @ https://doi:10.2196/jmir.6.3.e34.
26. Lyell DJ, Power M, Murtough K, Ness A, Anderson B, Erickson K, et al. Surgical Techniques at Cesarean Delivery: A U.S. Survey. The Surgery Journal (N Y). 2016;2(4): e119-e125. Available online @ https://doi:10.1055/s-0036-1594247.
27. Franchi M, Ghezzi F, Balestreri D, Beretta P, Maymon E, Miglierina M, et al. A randomized clinical trial of two surgical techniques for cesarean section. Am J Perinatol. 1998;15(10):589-94. Available online @ https://doi:10.1055/s-2007-994066.
28. Macones GA, Caughey AB, Wood SL, Wrench IJ, Huang J, Norman M, et al. Guidelines for postoperative care in cesarean delivery: Enhanced recovery after surgery (ERAS) society recommendations (part 3). Am J Obstet Gynecol 2019;221:247.e1-9
29. Bain E, Wilson A, Tooher R, Gates S, Davis L-J,Middleton P.Prophylaxis for venous thromboembolic disease in pregnancy and the earlypostnatal period. Cochrane Database Syst Rev 2014;2:CD001689