

The Prevalence of Spinal Headache in Post Caesarean Section Patients in Nile University Teaching Hospital La Prevalence Des Cephalées Post-Puncture Lombaire Chez Les Patientes Post-Cesarienne A L'hôpital Universitaire De Nile.

¹Nwokorie RM., ²Kwari SD., ¹Acha KC. ²Balogun A.

Departments of ¹Anaesthesia, and ²Obstetrics and Gynaecology, Nile University Teaching Hospital/
Nile University, Abuja, FCT., Nigeria

Correspondence: Dr. Rosemary Mabong Nwokorie, Department of Anaesthesia, Nile University Teaching Hospital/Nile University, Abuja, FCT., Nigeria. Email: nwokorier@yahoo.com

ABSTRACT

Background: Post-dural puncture headache (PDPH) is a known complication of dural puncture during epidural analgesia and subarachnoid block (SAB). It is common in pregnant women. The incidence is variable and is influenced by several factors.

Method: A prospective study that involved all consenting patients who had caesarean section done under SAB between June 2023 and November 2023. SAB was performed using Quincke needles, sizes 25G to 27G. Patients were followed up and data were collected using a structured questionnaire.

Results: One hundred and sixty-one (161) parturients were recruited and 36 had PDPH giving a prevalence of 22.36%. The majority 17 (47.22%) of the patients who developed PDPH, had mild headaches in severity, 14 (38.89%) had moderate headaches, and 5 (13.89%) had severe headaches. A higher incidence of headaches was found in women who had a successful procedure using 25G needles with multiple attempts than those who used 26 and 27 G needles and were successful at the first attempt.

Conclusion: The high prevalence of PDPH observed in this study may be attributed to the traumatic Quincke needles and multiple attempts at the institution of the block.

Keywords: Caesarean section, Post dural puncture headache, Subarachnoid block, Quincke needles

ABSTRAIT

Contexte: La céphalée post-ponction durale (PDPH) est une complication connue de la ponction durale lors d'une analgésie péridurale et d'un bloc sous-arachnoïdien (SAB). Il est plus fréquent chez les femmes enceintes. L'incidence est variable et est influencée par plusieurs facteurs.

Méthode: Une étude prospective qui a impliqué tous les patients consentants qui ont subi une césarienne pratiquée sous SAB entre juin 2023 et novembre 2023. Le SAB a été réalisé à l'aide d'aiguilles Quincke de tailles 25G à 27G. Les patients ont été suivis et les données ont été recueillies à l'aide d'un questionnaire structuré.

Résultats: Cent soixante et une (161) parturientes ont été recrutées et 36 avaient une PDPH donnant une prévalence de 22,36 %. La majorité de 17 (47,22 %) des patients qui ont développé une HPD avaient des maux de tête légers de sévérité, 14 (38,89 %) avaient des maux de tête modérés et 5 (13,89 %) avaient des maux de tête sévères. Une incidence plus élevée de maux de tête a été observée chez les femmes qui ont réussi une procédure à l'aide d'aiguilles 25G avec plusieurs tentatives que chez celles qui ont utilisé des aiguilles 26 et 27 G et ont réussi au début essayer.

Conclusion: La prévalence élevée de la PDPH observée dans cette étude peut être attribuée aux aiguilles de Quincke traumatisantes et aux multiples tentatives d'établissement du bloc.

Mots-clés: Césarienne, Céphalée post-ponction durale, Bloc sous-arachnoïdien, Aiguilles de Quincke

INTRODUCTION

The subarachnoid blockade, also known as spinal anesthesia, is widely used for caesarean section due to its low cost, safety, and ease of administration (1). Spinal anaesthesia has a rapid onset with intense sensory and motor block effects which ensures excellent operating conditions (2).

Post-dural puncture headache (PDPH) is a common iatrogenic complication of spinal anaesthesia, or lumbar puncture used for diagnostic or therapeutic purposes. It is defined as a headache occurring within 5 days after lumbar puncture, worsened when standing or sitting, and relieved when lying flat by the International Classification of Headache Disorder (3). It is usually a self-limiting process and even without medical intervention, 75% resolve within the first week and 88% resolve by 6 weeks (4). Treatments are given to treat symptoms, lessening the discomfort until the dura heals (5).

PDPH usually results from loss of cerebrospinal fluid due to leakage from the dural opening made by a spinal needle. Consequently, there is a loss of cerebrospinal pressure around the spinal cord and a loss of buoyancy supporting the brain. In an upright position, the brain sags and creates tension on the meninges and other pain-sensitive intracranial structures leading to the pain seen in PDPH (6). PDPH is commoner in females with almost twice the risk of developing PDPH compared to men (7). In women, it is commoner in the reproductive age group and pregnant females (8). This is due to high levels of oestrogen which can influence the tone of the cerebral vessels, causing pain as a result of vascular distension (9). In a vertical posture, the hydrostatic gradient across the brain increases forcing more CSF to drain through the dural puncture.

The body attempts to compensate for the loss of intracranial volume by vasodilatation (7). Forty percent (40%) of postpartum women experience headaches, however, 50 to 75% are tension or migraine headaches and only five to 15% are PDPH (10). Twenty-four (24%) are due to preeclampsia according to a study by Stella CL et al (11).

Classically, PDPH usually presents as a dull, throbbing, severe, frontal, or occipital headache. It is worsened on assuming a sitting or upright position and relieved on lying supine. It is usually associated with nausea, vomiting, neck stiffness, and audiovisual disturbances (12).

Following spinal anaesthesia, PDPH is more likely with a larger gauge cutting tipped needle as well as following many attempts as this might cause several dural punctures. Smaller spinal needles and pencil point tips such as Whitacre and Sprotte needles are associated with lower rates of PDPH than larger or cutting-tip needles (2). According to the literature, the incidence of PDPH after spinal anaesthesia varies from 0.3% to 40% and is affected by factors such as age, gender, needle size, type, multiple attempts of spinal performance, and previous PDPH (13,14).

Though PDPH may resolve spontaneously, while it lasts, it affects the mother's capability to cater to her newborn, affecting bonding. In severe cases, it may lead to an extension of hospital stay. In rare circumstances, serious complications like subdural haematoma, seizures, sagittal sinus thrombosis, and cranial nerve palsies may occur (15). Conservative management involves bed rest and fluids. Pharmacological management includes acetaminophen and non-steroidal anti-inflammatory drugs. Others are caffeine, synthetic

corticotrophin, serotonin agonists, gabapentin, theophylline, and hydrocortisone. Invasive management includes sphenopalatine ganglion block and epidural blood patch (16).

METHOD

This prospective study was done at the Nile University Teaching Hospital Abuja. The aim was to determine the prevalence of PDPH, as well as evaluate the severity and some associated factors of PDPH after subarachnoid block in parturients who had a caesarean section. All consenting patients who had caesarean sections done under subarachnoid block between June 2023 and November 2023 were recruited. Spinal anaesthesia was performed using Quincke needles sizes 25G to 27G. Parturients were followed up and data were collected using a structured questionnaire. Approval from the Ethics Committee of Asokoro District Hospital was sought and obtained. Data was analyzed using Statistical Package for Social Sciences (SPSS software version 26) and presented as frequencies and means. Chi-square was used to test for association and p-value < 0.05 was considered statistically significant. Results were presented in tables and figures.

Preoperative reviews were carried out and patients with chronic headaches, contraindications to sub-arachnoid block, and impaired consciousness were excluded from the study. The patients were counseled for subarachnoid anaesthesia and consent was obtained. Consent to participate in the study was also obtained.

The Numerical Rating Scale used in grading the severity of the headache post-operatively was carefully explained to them. The scale was from 0 to 10. 0 means no pain; mild pain is 1 – 3; moderate pain is 4 – 6; severe

pain is 7 -9; while 10 is the worst possible pain (17).

In theatre, monitoring parameters included pulse oximetry and Non-invasive blood pressure. The blood pressure was measured every minute for the first 10 minutes, every 2 minutes for the next 10 minutes, then every 3 minutes subsequently. Patients were preloaded with 500mls to 1000mls of warm normal saline. Spinal anaesthesia was instituted under aseptic conditions using 2 to 2.5mls of 0.5% heavy bupivacaine. Patients were positioned supine with a left lateral tilt after confirming adequate blockade using the Bromage score, with a pillow under their head. The block was performed by nurse anaesthetists and physician anaesthetists.

At the end of the procedure, the questionnaire was filled out with the patient's biodata, size of needle used, dose of local anaesthetic, and the number of attempts. The hospital has only Quincke needles, sizes 25G to 27G which were used for the study. The needle size used was determined by choice and availability at the time of the surgery. The parturient was followed up daily and the presence or absence of headache was confirmed at the end of the fifth postoperative day.

RESULTS

One hundred and sixty-one patients had subarachnoid anaesthesia for caesarean section, out of which 36 (22.36%) patients had PDPH while 125 (77.64%) did not experience any headache. The mean age of the patients was 32.21 ± 5.226 years. Ninety-nine (61.49%) of the 161 caesarean sections were done as emergencies, while 62 (38.51%) were elective. This is shown in Table 1 The majority 78(48.44%) of the subarachnoid block was successful

Table 1: Age group/Type of surgery among Respondents and Prevalence of PDPH

Variables	Frequency (N=161)	Percentage (%)
Age group		
16-24	10	6.21
25-29	41	25.47
30-34	55	34.16
35-39	39	24.22
40-44	16	9.94
Headache		
Yes	36	22.36
No	125	77.64
Type of Caesarean section		
Elective	62	38.51
Emergency	99	61.49
Total	161	100

Table 2: Number of attempts, needle size, cadre of staff, and severity of Headache

Variables	Frequency (N=161)	Percentage (%)
Number of attempts		
1	78	48.44
2	47	29.19
3	25	15.53
4	11	6.84
Total	161	100
Needle size		
25G	51	31.68
26G	41	25.47
27G	69	42.85
Total	161	100
Cadre of staff		
Doctor	53	32.92
Nurse	108	67.08
Severity of headache		
0-3	17	47.22
4-6	14	38.89
7-9	5	13.89
Total	36	100

at the first attempt, 47 (29.19%) at the second attempt, 25 (15.53%) at the third attempt, and 11 (6.84%) at the fourth attempt. All the blocks were done with Quincke needles. Size 27G was the commonest used in 69 (42.85%) surgeries, 25G in 51 (31.68%) surgeries, and 26G in 41 (25.47%) surgeries. Physician anaesthetists performed 53 (32.92%) of the blocks while nurse anaesthetists performed 108 (67.08%) blocks. The majority of 17 (47.2%) of the patients who developed PDPH, had mild headaches in severity, 14

Table 3: Relationship Between Needle Size and Headache

	Headache (Yes)	Headache (No)	P-Value	X ²
Needle size				
25G	22(43.14%)	29(56.86%)	0.000	18.56
26G	7(17.07%)	34(82.93%)		
27G	7(10.14%)	62(89.86%)		
No of attempts				
1	10(12.82%)	68(87.18%)	0.000	46.03
2	11(23.40%)	36(76.60%)		
3	10(40%)	15(60%)		
4	5(45.45%)	6(54.55%)		
Type of caesarean section				
Elective C/S	13(20.97%)	49(79.03%)	0.737	0.11
Emergency C/S	23(23.23%)	76(76.77%)		

(38.9%) had moderate headaches, and 5 (13.9%) had severe headaches. This is illustrated in Table 2 .

Table 3 shows the relationship between the development of PDPH with some patient and procedural factors. Out of 51 patients who used a 25G needle, 22 (43.14%) had headaches, while 29 (56.86%) did not. Of the 41 patients who used 26G, seven (17.07%) had headaches, while 34 (82.93%) did not. Sixty-nine patients used 27G needles, seven (10.14%) had headaches while 62 (89.86%) did not. Seventy-eight (48.44%) patients had a successful subarachnoid block on the first attempt, 47 (29.19%) on the second attempt, 25 (15.53%) on the third attempt, and 11(6.84%) on the fourth attempt.

Of the 78 that had a successful block at the first attempt, 10 (12.82%) had headaches, while 68 (92.73%) did not. Of the 47 (29.19%) patients who had a successful block at the second attempt, 11 (23.40%) had headaches, while 36 (76.60%) did not. Of the 25 (15.53%) that had a successful block on the third attempt, 10 (40%) had headaches, while 15 (60%) did not. Of the 11(6.84%) patients who had a successful block at the

fourth attempt, five (45.45%) had headaches, while six (54.55%) did not. This relationship was statistically significant (p = <0.001).

There were 62 elective cases and 99 emergency cases. Thirteen (20.97%) of the 62 elective cases had headaches, while 49 (79.03%) did not. Twenty-three (23.23%) of the 99 emergency cases had a headache, while 76 (76.77%) did not. This relationship was not statistically significant (p = 0.737).

DISCUSSION

The subarachnoid block is the commonest anaesthetic technique for surgeries below the umbilicus. It is a commonly used anaesthetic technique for caesarean section. Thus, unless the patient refuses to consent or there are contraindications to the procedure, a subarachnoid block is the anaesthetic technique of first choice. This is because this technique is associated with less morbidity and mortality when compared to general anaesthesia.

The challenges in airway management, maternal well-being, and neonatal well-being due to the transfer of anaesthesia drugs, and other concerns are largely eliminated (9).

Parturients who have had operative delivery under subarachnoid block are at risk of developing PDPH due to their gender, pregnancy, and higher rate of exposure to neuraxial blocks (18,19). The occurrence of this headache is very uncomfortable for the patient. The dissatisfaction of the mother with spinal anaesthesia can result in refusal of the technique in subsequent surgeries, disruption of baby care, prolonged hospital stay, and cost (19).

The prevalence of PDPH in this study was 22.36%. This is slightly higher than that obtained in a study by Nuhu SI et al despite using smaller gauge spinal needles (20). This can be explained by the definition of PDPH. In the study by Nuhu et al, the patients were followed up for 48 hours unlike in this study where they were followed up for 5 days following the definition of headache by the International Classification of Headache. In a similar study done by Ahsan et al there were zero incidences of PDPH among 125 patients who had spinal anaesthesia (21). This can be attributed to the use of atraumatic needles (Polymedic, 25G) compared to our use of Quincke, cutting needles.

In a study by Mohammed AD et al, the incidence was reported to be 15.8% (22). This is lower than that of this study despite using similar sizes of Quincke needles. This can be explained by the fact that they used a few pencil point needles. Also, the majority of the spinal anaesthesia was performed by physician anaesthetists who have more expertise, unlike in our study where the majority of the cases were taken by nurse anaesthetists. In our centre, due to the low number of physician anaesthetists, most caesarean sections are taken by the nurses except the ones with medical concerns and/or complications.

Needle size might be the most significant factor in the development of PDPH (23). Spinal needles generally used today are 22G to 27G, but sizes ranging from 19 to 30G are available (23). The incidences of PDPH after spinal anaesthesia performed with Quincke, a cutting needle, is 36% with a 22G needle, 25% with a 25G needle, two to 12% with a 26G needle, and less than two percent for smaller than 26G needle (24,25, 26).

In this study, 22 of 51 patients who used 25G needles had headaches, while seven of the 41 patients who used 26G had headaches. Seven of the 69 patients who used 27G needles had headaches. This gives an incidence of 43.14%, 17.07%, and 10.14% respectively for the different needles. The smaller needle diameter reduces the incidence of PDPH because the dural openings are smaller. However, the extremely thin needles from 27G become too thin to maneuver leading to a high failure rate and possibly, multiple dural punctures due to multiple attempts (27). The difference could be because this is a smaller study compared to Xu et al, which is a meta-analysis comprising several studies (25). Again, other parameters like operator expertise and number of attempts were not stated.

The higher the number of attempts, the higher the risk of headaches due to multiple dural punctures. In this study, the incidence of headaches increased as the number of attempts increased. From 12.82% with one attempt to 45.45% with four attempts. This result is consistent with that of a study by Mekete et al which showed that the incidence of headaches increased with more than two attempts (28).

The incidence of headaches in both

elective and emergency surgeries was close, 20.97% and 23.23% respectively. This showed that being an emergency surgery did not have any effect on the development of headaches. This is consistent with the study conducted by Mayer DC (29). It is however unlike the study done by Nuhu SI where the prevalence of headache was higher in parturients who had emergency caesarean section (20).

The researchers could not collect the data of all the patients recruited and had to rely on others to take and input the correct data. Some information was either missing or not correctly captured. Some of the patients had difficulty understanding the numerical rating scale for the severity of the headache. These were the limitations of our study. The major strength of the study is its prospective nature and data collected was verified and any missing or incorrectly entered data was promptly corrected.

CONCLUSION

The prevalence of PDPH in this study is 22.36%. This high prevalence was associated with an increase in the number of attempts, the size, and the design of the spinal needle.

Cutting needles and frequent attempts during the performance of the technique leads to a high risk of PDPH.

There is, therefore, a need to procure pencil point needles for routine use for spinal anaesthesia and training on the use of smaller gauge needles to avoid multiple attempts.

Authors Contribution

Concept and design: Dr. Rosemary Nwokorie and Dr. Shiktira Kwari

Acquisition, analysis, and interpretation of data: Dr. Rosemary Nwokorie, Dr. Shiktira Kwari, Dr.

Kalu Acha, Dr. Balogun

Drafting of the manuscript: Dr. Rosemary Nwokorie

Manuscript review: Dr Shiktira Kwari

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