Port Harcourt Medical Journal

(Official Journal of the College of Health Sciences, University of Port Harcourt)

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Editorial Board

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Editorial

Making use of available health resources in Nigeria

Health care systems around the globe are struggling with limited resources.[1] These resources are not only financial but also resources in terms of personnel, competences, equipment, pharmaceuticals, facilities.[1] Hence, public health systems, which are those that provide publicly funded healthcare, are under a great deal of pressure from the global economic crisis, under-staffing, and budgetary constraints.[2] This has further been compounded by the COVID-19 pandemic which has revealed the massive shortcomings of health systems globally, particularly in developing countries like Nigeria, with weak healthcare infrastructure and chronic high morbidity and mortality from both infectious and non-infectious diseases.[3] Rising health care demand, an increase in the burden of diseases on infrastructure, technology improvements, shifting service models, rising customer expectations, and shifting service accessibility also place pressures that affect health systems globally.[2]

As a result of these challenges, there is a need to prioritize and allocate available resources for the general good of all the citizenry.[1] For hospitals, this would imply that they cannot continue to operate as they did in the past if they want to survive. [4] The hospitals will have to learn to meet rising healthcare demands without a proportionate increase in resources.[4] They will have to cope with higher expectations in relation to the quality of treatment and care rendered, but also increasingly of the quality of the patient experience and workplace environment.[4]

Hence, hospitals will have to become considerably more efficient in the way they operate.[4] Effective capacity management is one of the key components that hospitals will require to achieve optimal resource efficiency and thrive in this harsh environment.[4] It is key to achieving optimal resource utilization through aligning resources, processes, and planning across individual providers and networks as well as a fundamental component in any strategy to ensure that hospitals survive in a world where resources are scarce and there are higher demands.[4] Effective capacity management is a solution that encompasses the entire organization.[4]

In the context of Nigeria, it is recommended that there should be optimal allocation of scarce medical resources in ways that would maximize health care delivery benefits to the greatest number of people, give priority to those worse off, ensure equality and promote continued care provision for all conditions.[3] Funding priority should be given to essential prevention and treatment services for communicable diseases, including immunizations; services related to reproductive health, including pregnancy and childbirth; core services for vulnerable populations, such as infants and older adults; provision of medicines; management of emergency health conditions and common acute illnesses; and auxiliary services, such as basic diagnostic imaging, laboratory, and blood bank services.[3] Nigerian policymakers should also ensure that social protection services are instituted and maintained;[3] and the government should ensure accountability for all funds released.[3]

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Original Article

The aftermath of sexual violence among young adult females in Southern Nigeria: disclosure, care-seeking, consequences and effects on sexual behaviour

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Abstract

Background: In spite of the high worldwide prevalence of sexual violence which disproportionately affects women and girls, care and support services for the victims are often deficient for various reasons including non-disclosure due to stigma, shame and inability to access help.

Aim: This study examined the aftermath of sexual violence among female undergraduates of the Niger Delta University Bayelsa State who reported having experienced sexual violence.

Methodology: Data of the 83 (19.2%) victims identified through a cross-sectional study of 429 female undergraduates selected by systematic random sampling was extracted to determine the pattern of disclosure, care-seeking, consequences and effects on sexual behaviour. Data analysis employed SPSS version 29 and Chi-square test was used to determine sociodemographic factors significantly associated with disclosure with the level of significance set at $p<0.05$.

Results: The victims were aged 15-29 (mean 21.9 ± 2.8) years and 35(42.2%) disclosed their experiences to a third party with commonest reasons for non-disclosure being shame and self-blame [33(68.8%)]. There was no significant association between disclosure and sociodemographic factors ($p>0.05$). Over half [57(68.7%)] did not seek medical care, mostly due to fear of disclosure. Vaginal pain [33(39.8%)] and depression [81(97.6%] were the commonest physical and psychological consequences reported. The main effects on sexual behaviour included risky sexual behaviour [25(64.1%)] aversion to sex [15(38.5%)] and engagement in same-sex relationships [6(15.4%)].

Conclusion: The study confirms previously documented poor disclosure and care-seeking behaviors with many physical and psychological consequences and negative effects on sexual behaviour for the victims of sexual violence.

Keywords: Sexual violence, females, disclosure, consequences, care-seeking, Nigeria

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INTRODUCTION

Sexual violence remains a pervasive global public health and human rights issue, disproportionately affecting women and girls worldwide.[1] Globally and in sub-Saharan, the lifetime prevalence of sexual violence perpetuated by an intimate partner is 27% and 33% respectively.[1] In low- and middle-income countries, including Nigeria, structural inequalities, gender norms, and weak institutional responses increase the risk of sexual violence, leaving many survivors without adequate support.[2] Nigerian studies indicate a high prevalence of sexual violence among young women, particularly in educational settings with rates as high as 1 in 5 female undergraduates being affected.[3] However, under-reporting remains a significant challenge.[4]

Survivors of sexual violence often experience negative effects ranging from health problems such as physical (pain syndromes, injuries and death) and psychological/social (post-traumatic stress, anxiety disorders, depression, self-harm, substance abuse, suicide, etc), sexual and reproductive health challenges such as sexual dissatisfaction, risky sexual behaviors, chronic pelvic pain, unintended pregnancies, increased risk of sexually transmitted infections, and economic effects such as missed working days and significant loss of revenue.[4,5] Some experiences also impact negatively on academic performance and, in some instances, cause academic disruptions.[5]

Despite these documented effects, many survivors do not seek medical or psychosocial support.[6] A study in Southwest Nigeria revealed that only 42.2% of survivors reported their sexual violence experiences, and up to 68.7% did not seek medical care after the assault due to stigma, fear of retaliation, and institutional mistrust, as well as concerns about confidentiality, which serve as barriers to accessing care. [7,8] Additionally, societal norms and power imbalances such as "sex for grades" exploitation in universities further silence survivors and hinder disclosure.[9] Even when survivors seek help, barriers such as victim-blaming, lack of confidential services, and economic dependence prevent them from accessing medical care or legal justice.[10]

While some interventions exist, such as trauma-informed clinical guidelines in some countries[11] critical gaps persist in understanding the full spectrum of survivors' care-seeking behaviors and the structural barriers they face.[12] Furthermore, the language used to describe survivors whether as "victims" or "survivors" can impact on their willingness to seek the help they need.[13] Thus, most survivors of sexual violence remain 'silent survivors'.[14]

Therefore, this study explored the aftermath of sexual violence among female undergraduates of the Niger Delta University with a focus on their disclosure, care-seeking behaviors, consequences and the effects on their sexual behaviors with a view to generating evidence for policy formation for the prevention of sexual violence, holding the perpetrators accountable and improvement of the care and support for victims.

MATERIALS AND METHODS

This was a descriptive cross-sectional study carried out at the Niger Delta University (NDU), a Bayelsa State-owned tertiary educational institution located at Wilberforce Island; about 30 kilometers from Yenagoa, the capital of Bayelsa State. The NDU, established in the year 2000 but started academic activities in the year 2001/2002, offers both undergraduate and postgraduate programmes in its 14 academic faculties located on three campuses. Presently, the NDU has a staff strength (academic and non-academic) of over 3000 with over 20,000 students from Bayelsa and nationwide enrolled in its programmes.

This study reported the sexual violence experiences of 83 (19.3%) female undergraduates out of the 429 female undergraduates of the NDU recruited in a cross-sectional study in which they completed a self- administered questionnaire that explored their knowledge and experiences of sexual violence. Data from the 83 victims was extracted and analyzed with focus on the aftermath of the experience in the aspects of disclosure of the experience, care-seeking,

consequences and effects on sexual behaviors of the victims. Data analysis employed the IBM Statistical Package for Social Science (SPSS) version 29.0 (IBM Corporation, Chicago, IL, USA) and results were presented using tables and charts. Frequencies and percentages were used for categorical variables while means and standard deviations were used for numerical variables. The Chi-square test was used to determine sociodemographic factors associated with sexual violence with the level of significance set at $p<0.05$.

Ethical approval for the study was obtained from the Research and Ethics Committee of the Niger Delta University Bayelsa State (Ref No: 01-0712023/014). Written informed consent was obtained from all eligible participants before they participated in the study. All information obtained from the participants was treated as confidential.

RESULTS

The 83 victims were aged 15-29 (21.9 ± 2.8) years with most; 48 (57.8%) aged between 20 and 24 years, 53 (63.9%) in years 4- 6 of their study and 72 (86.7%), single. Most of them; 60 (72.3%) resided off-campus and 51(61.6%) lived with either their parents, friend or relatives. Most of them; 57 (68.4%) were from family backgrounds where their parents were married. Thirty- five (42.2%) victims disclosed their experiences. However, there were no significant differences between the sociodemographic profiles of the victims who disclosed and those who did not disclose their experiences (Table 1).

The most common confidants were friends; 29(82.9%), mothers; 9 (25.7%), and fathers; 4 (11.4%) with the main reasons for non-disclosure being shame and self-blame; 33 (68.8%), fear of repercussions; 15 (31.3%), and fear of not being believed; 11 (22.9%) (Table 2).

The most prevalent physical consequences were vaginal pain in 33 (39.8%), poor sleep in 31(37.3%), and vaginal bleeding in 16 (19.3%) respondents. Majority; 57 (68.7%) did not seek care after the incident with the major reason given being fear of disclosure in 30 (52.6%) of them (Table 3).

Over half of the victims; 59(71.1%) saw their assailants (perpetrators) after the incident with most of them; 36(61.0%) reporting anger as a predominant emotional response experienced during the encounter. Depression was the most common psychological consequence noted in 81(97.6%) following the incident. However, less than half; 39 (47.0%) victims reported changes in their sexual behaviors following their experience of sexual violence with increased risky sexual behaviors, and aversion to sex reported in majority; 25 (64.1%) and 15 (38.5%) cases respectively (Table 4).

DISCUSSION

This report on the disclosures, care-seeking, consequences, and effects on sexual behaviour of female survivors of sexual violence highlights the peculiar challenges they experience. Disclosure of any traumatic event, especially sexual violence, can be quite challenging hence many cases of sexual violence go unreported with consequent negative impact on the victim's care-seeking behaviour as previously documented.[16] The low rate of disclosure in the present study with common reasons for non-disclosure such as self-shame, self-blame and fear of stigmatization have been similarly noted by other authors.[17,18] Reports have shown that 55-95% of females who have experienced sexual violence do not disclose nor do they seek any type of treatment due to fears of victimization and stigma.[19] Providing easily accessible and survivor-based support services on campus would help to encourage prompt intervention and follow-up of victims.

The report of poor medical care-seeking following an incident of sexual violence observed in the present study has been similarly reported in other studies.[20,21]This speaks to the unavailability of emergency services on campuses which may delay opportunities for early medical and psychological intervention.[22] Lack of trust in health and legal systems has also been reported to contribute to reluctance to report cases of sexual violence.[23]

Table 1: Sociodemographic characteristics and determinants of disclosure of sexual violence by the 83 victims

Variables	N=83(%)	Disclosed (N =35)	Did not disclose (N =48)	χ^2	P-value
Age					
Mean ± SD	21.9 ± 2.8	22.6 (2.88)	21.5 (2.97)	1.695*	*0.094*
Age Group					
15 – 19 years	17(20.5)	5 (29.4)	12 (70.6)		
20 – 24 years	48(57.8)	22 (45.8)	26 (54.2)	1.438	*0.487*
25 – 29 years	18(21.7)	8 (44.4)	10 (55.6)		
Marital Status					
Single	72(86.7)	31 (41.9)	43 (58.1)	0.021	*0.884*
Married/Cohabiting	11(13.3)	4 (44.4)	5 (55.6)		
Family background					
Parents are married	57(68.7)	25 (43.8)	32 (56.1)	3.296	*0.069*
Parents are cohabiting	26(31.3)	6 (23.1)	20 (76.9)		
Place of Residence					
Off campus	60(72.3)	27 (45.0)	33 (55.0)	0.712	*0.399*
On campus	23(27.7)	8 (34.8)	15 (65.2)		
Residential companion					
Live alone	32(38.6)	13 (40.6)	19 (59.4)	0.015	*0.902*
Lives with others^{+}	51(61.4)	21 (41.2)	30 (58.8)		
Year of Study					
1st – 3rd year	30(36.1)	9 (30.0)	21 (70.0)	2.853	*0.091*
4th – 6th year	53(63.9)	26 (49.1)	27 (50.9)		

**t-test; $^{+}$Parents, friends, other relatives.*

Table 2: Disclosure and reasons for non-disclosure of sexual violence among the 83 victims

Characteristics	Frequency N = 83	Percent (%)
Disclosure		
Yes	35	42.2
No	48	57.8
Patterns of Disclosure*	**N = 35**	
Friend	29	82.9
Mother	9	25.7
Father	4	11.4
Teacher	3	8.6
Sister	3	8.6
Counsellor	3	8.6
Therapist		
Aunt	3	8.6
Brother	2	5.7
Uncle	2	5.7
Police	2	5.7
Spiritual Leader	1	2.9
Reasons for non-disclosure*	**N = 48**	
Shame and self-blame	33	68.8
Fear of repercussions	15	31.3
Fear of not being believed	11	22.9
Threat from the perpetrator	3	6.3
Bribe from the perpetrator	3	6.3
Did not feel it was necessary	3	6.3

***multiple responses**

Table 3: Physical consequences of sexual violence and care-seeking behaviours after the incident in the 83 victims

Characteristics	Frequency	Precent (%)
Physical consequences*	**N = 83**	
Vagina Pain	33	39.8
Poor Sleep	31	37.3
Vagina Bleeding	16	19.3
Pain While Urinating (Dysuria)	14	16.9
Vagina Discharge	9	10.8
Excessive Sleep	9	10.8
Laceration	8	9.6
Sexually Transmitted Infections	4	4.8
Bedwetting	3	3.6
Unwanted Pregnancy	2	2.4
HIVAIDS	2	2.4
Uterine cramps for months	1	1.2
Very painful menstruation	1	1.2
Fractures	1	1.2
Faecal Incontinence	1	1.2
Sought care after incident		
Yes	26	31.3
No	57	68.7
Place of care	**N = 26**	
Hospital	12	46.1
Pharmacy/Chemist	10	38.5
Church	4	15.4
Reason for no care-seeking*	**N = 57**	
Fear of disclosure	30	52.6
Unaware of the need	21	36.8
Financial barriers	17	29.8

***Multiple responses**

Table 4: Psychosocial consequences and effects on sexual behaviors of the victims of sexual violence

Characteristics	Frequency N = 83	Percent (%)
Post-assault perpetrator encounter		
Yes	59	71.1
No	24	28.9
Emotional reactions*on seeing the perpetrator	**N = 59**	
Anger	36	61.0
Fear	21	35.6
Guilt	19	32.2
Rage	19	32.2
Shame	17	28.8
Vengeance	8	13.6
Forgiveness	7	11.9
Disgust	4	6.8
Psychosocial sequelae*		
Depressive symptoms (including major depression)	81	97.6
Self-blame	41	49.4
Guilt	38	45.8
Anger	36	43.4
Social withdrawal	31	37.3
Stigma-related anxiety	31	37.3
Fear of revictimization	30	36.1
Self-loathing	22	26.5
Heterosexual aversion	22	26.5
Hyper sexuality	18	21.7
Hypo-sexuality	16	19.3
Appetite disturbance (including loss)	14	16.9
Suicidal behaviour	10	12.0
Academic impairment	6	7.2
Reported behavioral impact of sexual violence	**n= 83**	

Yes	39	47.0
No	44	53.0
Reported sexual behavioural changes	**n = 39**	
Increased sexual risk-taking	25	64.1
Sexual aversion	15	38.5
Engagement in same-sex relationships	6	15.4
Became a sexual violence perpetrator	1	2.6

Lack of unawareness of post sexual violence care needs was also noted as a major reason for non-disclosure. Many survivors do not recognize sexual violence as reportable or believe that nothing can be done.[24] This leads to delays in disclosure which prevents prompt treatment and support for victims and subsequent severe health consequences.[25] Advocacy through school and community-based campaigns as well as social media digital movements such as the "#MeToo" movement can help to create much needed awareness about sexual violence and provide support for the victims.[26]

Consequences of sexual violence were seen as both short-term and long-term and the effects were both physical and psychological as previously reported by other authors.[27] Women who had experienced violence were also more likely to suffer from depression, anxiety disorders, unplanned pregnancies, sexually transmitted infections, and HIV, with long-lasting consequences.[28] Risky sexual behaviors and aversion to the opposite sex as effects on sexual behaviour in victims of sexual violence have similarly been reported by other authors.[29] These highlight the need for continuous long-term psychotherapy for victims of sexual violence which has been shown to be helpful in combating the associated post-traumatic stress disorder and interpersonal difficulties.[30]

CONCLUSION

Sexual violence negatively affects women's physical, mental, sexual, and reproductive health. This study confirms previously documented poor disclosure and care-seeking behaviors with many physical and psychological consequences and negative effects on sexual behaviour for the victims of sexual violence. These highlight the needs for policies and programmes to prevent the occurrence, hold offenders accountable and support the victims through improved access to care and counselling services to mitigate the consequences.

Limitations of this study

Being a descriptive study which involved obtaining retrospective information from participants, the findings may be affected by recall bias. Furthermore, the bias of social desirability might have affected the participants' answers considering the delicate nature of the subject.

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Conflicts of interest

The authors declare no conflict of interest associated with all the information presented in this research paper.

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Author Contributions

CD conceptualized the study and wrote the initial manuscript draft which was edited and revised by all authors.

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Original Article

Dental emergencies at the University of Port Harcourt Teaching Hospital

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Abstract

Background: Dental emergencies represent a significant burden in both developed and developing countries, often requiring immediate intervention to manage pain, infection, trauma, or life-threatening complications.

Aim: This study aimed to evaluate the spectrum, frequency, and demographic distribution of dental emergencies presenting at the University of Port Harcourt Teaching Hospital (UPTH).

Methods: A retrospective, descriptive cross-sectional analysis was conducted on all dental emergencies presenting to UPTH's Dental Out-Patient Clinic and Emergency Department from January 2023 to December 2024. Data were collected from clinical records and analyzed using descriptive statistics and chi-square tests.

Results: A total of 1,598 cases were recorded, with the majority (94.1%) presenting at the dental out-patient clinic. The mean age of the patients was 33.2 ± 16.8 years, and females accounted for 59.0% of the cases. Odontogenic infections were the most common emergencies (86.5%), particularly acute apical periodontitis (61.5%). Traumatic dental injuries constituted 6.4%, while jaw and soft tissue trauma accounted for 3.9%. Significant associations were found between type of emergency and age, gender, and route of presentation ($p < 0.001$). Trauma-related cases were predominantly seen in males and presented more frequently at the emergency unit.

Conclusion: Dental emergencies at UPTH were predominantly odontogenic infections presenting at the out-patient clinic, while trauma-related cases were more likely to present through the emergency department.

Keywords: Dental emergencies, odontogenic infections, maxillofacial trauma

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INTRODUCTION

Dental emergencies are acute oral health conditions that often require immediate clinical intervention to arrest bleeding, alleviate severe pain, manage infections, prevent further tissue destruction, or address potentially life-threatening complications.[1,2] These emergencies encompass a wide spectrum of presentations resulting from trauma, pulpal or periapical infections, periodontal diseases, or complications

following dental procedures. [1,3] Dental emergencies constitute a significant aspect of the global burden of oral health conditions in both developed and developing countries, comprising a large proportion of cases seen in both out-patient dental clinics and hospital emergency departments.[4-6] However, in low- and middle-income countries (LMICs), like Nigeria, the burden of dental emergencies is often exacerbated by delayed presentation, poor oral hygiene practices, and limited access to both preventive and therapeutic dental care.[7] The bulk of dental emergencies result from untreated dental caries and periodontal diseases which subsequently progress to conditions such as irreversible pulpitis, acute apical periodontitis, periapical abscesses, and even cellulitis.[5-7] In children and adolescents, traumatic dental injuries also contribute significantly to emergency visits and can lead to long-term functional and aesthetic deficits if not properly managed.[1,8]

The pattern and presentation of dental emergencies can vary widely depending on geographic, socioeconomic, and cultural factors. In Nigeria, previous studies have shown that patients mostly visit the dental clinic because of pain, swellings, and holes in the teeth.[9,10] These conditions often reflect both the prevalence of untreated dental caries and the underutilization of routine dental care services, which may be due to cost, limited awareness, or fear of dental treatment.[5] On the other hand, studies in hospital emergency departments reveal that the commonest oral and maxillofacial emergencies include jaw fractures, soft tissue lacerations and traumatic dental injuries.[11-13]

Early recognition and prompt management of dental emergencies is essential because of their profound clinical and public health implications. If left untreated, dental emergencies e.g. deep fascial space infections can lead to airway obstruction or cause systemic sepsis, both of which are potentially life threatening.[14] Additionally, the economic burden associated with emergency dental care is considerable, as many patients seek treatment only when pain becomes unbearable or when complications arise, thereby requiring more resource-intensive interventions.[4,15] Furthermore, the high prevalence of dental-related emergency visits places additional pressure on hospital emergency units, already grappling with other medical emergencies and related cases.[16] This underscores the need for targeted studies that will explore the clinical presentation and the demographic characteristics of dental emergencies.

Despite their clinical significance, there is a relative paucity of epidemiological data on the burden and characteristics of dental emergencies in Nigeria. The University of Port Harcourt Teaching Hospital (UPTH) is a tertiary healthcare institution in Nigeria's Niger Delta region, it serves as a major referral centre for both medical and dental emergencies. Despite the increasing demand for emergency dental services in this setting, there is paucity of comprehensive data on the nature and distribution of dental emergencies encountered in this hospital. By examining the pattern of dental emergencies at UPTH, this study sought to fill a critical gap in the literature and provide empirical data to inform local clinical practice and health system planning. Previous Nigerian reports have mostly been skewed, examining only cases that presented to the emergency department. [11-13] However, many dental emergencies may also present to the dental out-patient clinic. This study aims to give a wholistic data by including all dental emergencies presenting at the emergency unit, as well as those presenting at the dental out-patient clinics.

Therefore, the aim of this study was to evaluate the spectrum, frequency, and demographic distribution of dental emergencies presenting at the University of Port Harcourt Teaching Hospital (UPTH). The findings will serve as a foundation for strategic interventions aimed at improving emergency dental services, informing public health interventions such as developing preventive oral health policies, resource allocation, and workforce training.

METHODS

Study design and population

This was a retrospective, descriptive cross-sectional study conducted at UPTH, Port Harcourt, Rivers State, Nigeria. The study population comprised all patients who presented with dental emergencies at the Dental Clinic as well as the Emergency Department of the Teaching Hospital over a two-year period (from January 2023 to December 2024). Emergency dental cases were identified from the clinical records and categorized based on presenting complaints and final diagnoses.

Inclusion and exclusion criteria

All patients who presented with acute dental conditions necessitating immediate or urgent care (such as odontogenic pain, facial swellings, dentoalveolar trauma, uncontrolled bleeding, or post-operative complications), were included in the study. Exclusion criteria included patients with incomplete documentation or those who presented for elective or follow-up procedures.

Data collection

Data was extracted from the dental clinics registers and individual patient case notes using a structured data collection form. Variables collected include: demographics (age, gender), specific diagnosis and type of dental emergency, which was then categorized into five: (i) Dental/Orofacial infections (ii) Traumatic injuries to the teeth and their supporting structures (iii) Traumatic injuries to the jaw bones and orofacial soft tissues (iv) Traumatic injuries to the orofacial soft tissues only (v) Others.

Data analysis

The collected data was entered into IBM SPSS Statistics version 25 (IBM Corp., Armonk, NY, USA) and analyzed descriptively. Categorical variables were summarized as frequencies and percentages, while continuous variables (e.g., age) were reported as means and standard deviations. Associations between demographic variables and types of emergencies was determined using the Chi-square test or Fisher's exact test where appropriate. A *p*-value of <0.05 was considered statistically significant.

Ethical considerations

Ethical approval for the study was obtained from the Research and Ethics Committee of the University of Port Harcourt Teaching Hospital. [Protocol number: UPTH/ADM/90/S.11/VOL.XI/1921]. All data were handled with strict confidentiality, and patient identifiers were anonymized during data extraction and analysis in compliance with ethical standards for retrospective studies.

RESULTS

Overview

A total of 1,598 dental emergency cases were recorded between January 2023 and December 2024 at the University of Port Harcourt Teaching Hospital. Of these, 1,503 (94.1%) presented at the Dental Out-Patient Clinic, while 95 (5.9%) were seen at the Accident and Emergency (A & E) Department. The patients' ages ranged from 1 to 87 years, with a mean age of 33.2 ± 16.8 years. The highest frequency of cases (29.1%) occurred among individuals aged 20–29 years, followed by the 30–39 years age group (18.6%). There was a female predominance, with 655 males (41.0%) and 943 females (59.0%), giving a male-to-female ratio of approximately 1:1.4. (Table 1).

Distribution of emergency types

The most frequently encountered dental emergencies were odontogenic infections, accounting for 1,383 cases (86.5%). Traumatic dental injuries comprised 103 cases (6.4%), with complicated crown fractures, and traumatic tooth avulsions being the most common types. Trauma to the jawbones and orofacial soft tissues represented 62 cases (3.9%). Overall, the most frequent dental emergencies were acute apical periodontitis (61.5%), irreversible pulpitis (13.5%) and dentoalveolar abscess (10.9%). (Figure 1)

Demographic associations

There was a statistically significant association between age group and class of dental emergency ($p < 0.001$). Odontogenic infections were most prevalent in the third decade of life (20-29 years), while traumatic

dental injuries were more common in the second and fifth decades of life.

Temporal trends

Dental emergencies were most commonly encountered in the month of January (14.1%), and least seen in the month of August (5.6%). Figure 2 shows the monthly average of dental emergencies over the two-year period. Cumulatively, most of the cases were recorded in the first quarter of the year (January – March), while the fewest number of cases were seen during the third quarter (July – September). However, there was no statistical significance in the temporal trends. (Table 1)

Comparison based on route of presentation

There were notable differences in the presentation of dental emergencies, depending on the route of presentation. (Table 1) Cases presenting at the out-patient clinic peaked among those aged 20 – 29 years (29.4%), showed a female predominance (60.6%) and were mostly infective (91.3%) in origin. On the other hand, cases presenting at the accident/emergency department peaked among those aged 30 -39 years (29.5%), had male predominance (66.3%) and were mostly of traumatic aetiology (83.2%). These differences in age group ($p < 0.001$), gender ($p < 0.001$) and type of dental emergency ($p < 0.001$) were all statistically significant.

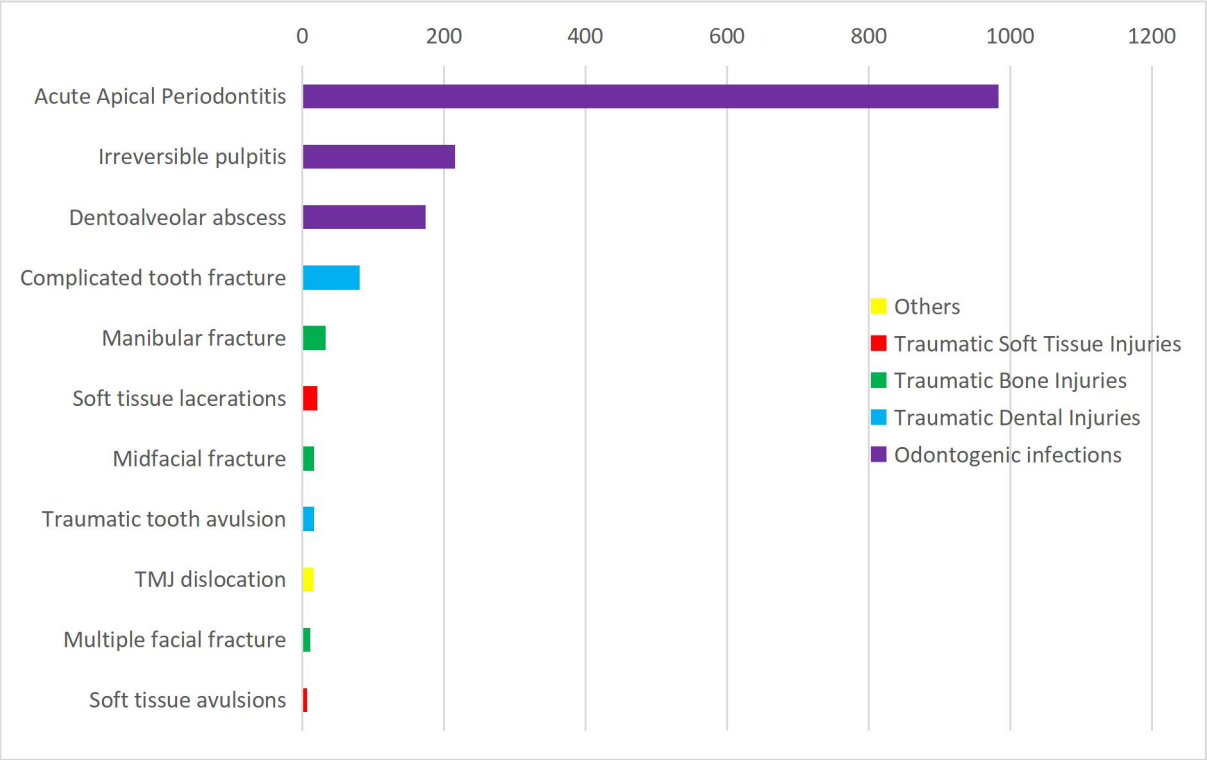

Figure 1. Distribution of dental emergencies by category

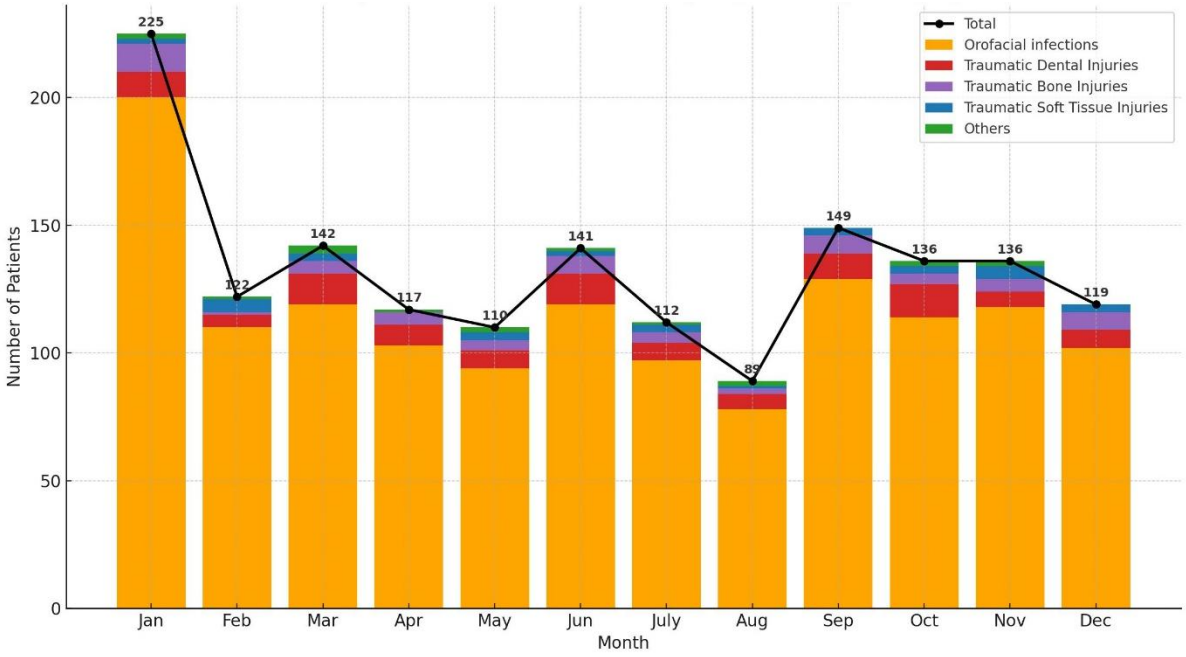

Figure 2. Average monthly distribution of the dental emergency cases

Table 1. Demographic characteristics of dental emergencies based on route of presentation

Demographic characteristics	**Overall N (%)**	**Out-Patient Clinic N (%)**	**Emergency Dept.* N (%)**	***p-value***
Age group (years)				
0 – 9	91 (5.7)	82 (5.5)	9 (9.5)	
10 – 19	226 (14.1)	219 (14.6)	7 (7.4)	
20 – 29	465 (29.1)	442 (29.4)	23 (24.2)	
30 – 39	297 (18.6)	269 (17.9)	28 (29.5)	**p=0.039**
40 – 49	242 (15.1)	225 (15.0)	17 (17.9)	
50 – 59	138 (8.6)	133 (8.8)	5 (5.3)	
60 – 69	93 (5.8)	88 (5.9)	5 (5.3)	
70 – 79	34 (2.1)	33 (2.2)	1 (1.1)	
80 – 89	12 (0.8)	12 (0.8)	0 (0)	
Gender				
Male	655 (41.0)	592 (39.4)	63 (66.3)	**p<0.001**
Female	943 (59.0)	911 (60.6)	32 (33.7)	
Type of Dental emergency				
Dental/Orofacial infections	1383 (86.5)	1372 (91.3)	11 (11.6)	
Traumatic dental injuries	103 (6.4)	98 (6.5)	5 (5.3)	**p<0.001**
Traumatic injuries to the jaw bones and orofacial soft tissues	62 (3.9)	21 (1.4)	41 (43.2)	
Traumatic soft tissue injuries	33 (2.1)	0 (0)	33 (34.7)	

Others	17 (1.1)	12 (0.8)	5 (5.3)	
Temporal trends				
January – March	489 (30.6)	462 (30.7)	27 (28.4)	
April – June	368 (23.0)	351 (23.4)	17 (17.9)	**p=0.334**
July – September	350 (21.9)	329 (21.9)	21 (22.1)	
October – December	391 (24.5)	361 (24.0)	30 (31.6)	
Overall Total	**1598 (100.0)**	**1503 (100.0)**	**95 (100.0)**	

*Dept. = Department

DISCUSSION

This study offers valuable insight into the pattern and burden of dental emergencies at the University of Port Harcourt Teaching Hospital (UPTH), highlighting critical epidemiological trends relevant to resource planning and emergency care delivery. A total of 1,598 cases were recorded over the two-year period, highlighting the substantial burden that dental emergencies place on tertiary care centres in low- and middle-income settings like Nigeria. The overwhelming majority (94.1%) of the cases presented at the dental out-patient clinic with only a minority seen at the accident and emergency department.

The mean age of patients in this study was 33.2 ± 16.8 years, and is similar to that seen in previous studies.[10,17] The age distribution of emergency cases revealed a peak in the 20–29-year age group, a finding that is consistent with previous Nigerian studies.[10,13] This age group may be more vulnerable due to poor oral hygiene habits, increased exposure to cariogenic diets, and inadequate preventive dental visits among young adults, possibly compounded by competing socioeconomic pressures.[12,18] The relatively high number of cases among females (59%) is consistent with patterns noted in other outpatient-based dental clinic audits, [10,19] and may reflect gender-based differences in healthcare-seeking behaviour, as women are generally more likely to utilize health services, including dental care, compared to men.[20] On the other hand, the male predominance observed among cases presenting at the Accident and Emergency Department, corroborates existing literature. This is because males are more likely to be involved in interpersonal violence, road traffic accidents, and sports injuries.[11-13]

Our findings reveal overwhelming predominance of dental/orofacial infections, which accounted for 86.5% of all emergency presentations. In particular, acute apical periodontitis, irreversible pulpitis, and dentoalveolar abscess were the most frequent diagnoses, reflecting the high prevalence of untreated dental caries and periodontal disease within the population.[7,21] These findings are consistent with previous studies in Nigeria and other low and middle income countries (LMICs), which indicate that patients mostly seek dental care as a result of pain.[19] This highlights that poor oral hygiene practices and delay in seeking care often led to advanced pulpal and periapical pathology at the time of presentation.[1,22,23] Thus, there is need for greater public education on the need to seek dental care early, in addition to utilising available preventive dental services, as inadequate use of preventive dental services, coupled with late presentation, likely contributes to the progression of otherwise manageable dental conditions into acute emergencies requiring urgent intervention.[5]

Traumatic dental emergencies, though less common than infections, accounted for 6.4% of cases, with complicated crown fractures being the most common presentation, similar to the findings of Al-Jundi et al.[24] This indicates that trauma to the anterior teeth, especially in children and adolescents, is a leading cause of dental emergency visits and may result in long-term functional and aesthetic challenges if not promptly managed.[1,8,24]

A significant strength of this study lies in its comparative evaluation of emergency presentations via two distinct routes: the dental outpatient clinic and the accident/emergency unit. The vast majority (94.1%) of cases presented via the Dental Out-Patient Clinic,

predominantly for infections, while only 5.9% presented to the Accident and Emergency Unit, most of which were trauma-related. This dichotomy was statistically significant across age group, gender, and class of emergency ($p < 0.05$), suggesting that while infective conditions are often perceived as painful but non-life-threatening, trauma-related emergencies are more likely to be perceived as urgent by both patients and healthcare providers. Similar findings were reported by Owotade et al.[11] indicating that non-trauma dental complaints are often underrepresented in hospital emergency audits. This underscores the need for integrated emergency care planning that considers the dual presentation routes of dental crises. These findings further buttress the importance of including both outpatient and emergency department data in epidemiological assessments of dental emergencies, as relying on one source alone may result in a skewed representation—as noted in prior studies limited to A&E data alone.[11,12] In contrast to the trend in LMICs, where most dental emergencies presenting to the emergency unit were trauma-related, in high-income countries (HICs), infection-related conditions were the predominant emergencies even in hospital emergency departments.[17] This may be attributed to better roads and better compliance to traffic regulations in HICs, thus reducing burden of trauma related to road traffic accidents.[25]

The implications of our findings are multifold. First, the high proportion of preventable caries-related conditions suggests a breakdown in primary preventive care and highlights the urgent need for improved oral health education, preventive care programs, and early intervention strategies. Community-based awareness and screening initiatives may help reduce the late presentation of dental conditions. Also, incorporating oral health into general primary healthcare initiatives may improve early diagnosis and reduce the burden on emergency services.[26] Second, the significant proportion of trauma cases also calls for increased public health efforts in injury prevention and road safety enforcement. Thirdly, from a service delivery standpoint, the disparity in cases seen at the outpatient clinics and the A&E department suggests that different types of clinical preparedness and staffing may be necessary at these two points of care. While outpatient services may benefit from expanded endodontic and minor surgical capabilities, the A&E department may require maxillofacial surgical expertise and trauma management tools.

Limitations of this study include its retrospective design and reliance on the accuracy of recorded diagnoses. Some cases may have been missed due to incomplete documentation. Additionally, this study did not account for socioeconomic factors, which may have provided further insight into the drivers of dental emergencies and their impact on quality of life. Furthermore, information on oral hygiene of the patients and caries status of other teeth were not collected leading to conjecture that the patients had poor oral hygiene and high burden of untreated caries. Nonetheless, the relatively large sample size and comprehensive inclusion of both outpatient and emergency unit data make our findings representative.

CONCLUSION

This study reveals that dental emergencies at UPTH were predominantly odontogenic infections, especially acute apical periodontitis, while trauma-related cases were less common but showed male predominance and were more likely to present through the emergency department. These findings highlight the need for regular dental visits to prevent or minimize the frequency of dental emergencies as recorded in the study. Emergency departments should be equipped and staffed appropriately to handle trauma-related dental emergencies, while routine clinics should strengthen capacity for managing infections effectively and promptly.

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Conflicts of interest

There are no conflicts of interest.

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Original Article

Awareness of gingival enlargement and pattern of dental care utilization amongst hypertensive patients in a Nigerian tertiary hospital

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Abstract

Background: Some antihypertensive drugs have been implicated in drug-induced gingival enlargement (DIGE), however, there is paucity in the literature on the level of awareness of DIGE among these patients. Hence, this study aims to assess the awareness, prevalence of DIGE, and the impact of dental care service (scaling and polishing) on the prevalence of DIGE among hypertensive patients at the University of Port Harcourt Teaching Hospital (UPTH).

Methodology: A cross-sectional study was conducted among hypertensive patients attending the Cardiology Outpatient Clinic at UPTH. Participants were selected using the convenience sampling method. Data collection was done using structured questionnaires, medical records and clinical oral examinations. Information on demographic variables, duration of antihypertensive medication use and dental care service utilization were also recorded. Data was analysed with significance set at $p<0.05$.

Results: There were one hundred and fifty (150) respondents; 64 males and 86 females, with an M: F of 1:1.25. The prevalence of gingival enlargement was 29.3%, with higher prevalence in patients on calcium channel blockers (Amlodipine) in combination with Angiotensin II receptor blocker (Telmisartan). None of the subjects was aware of gingival enlargement in hypertensive patients. Level of education, type of antihypertensive medications and no scaling & polishing were significantly associated with increased prevalence of gingival enlargement ($p = 0.000$).

Conclusion: The prevalence of drug-induced gingival enlargement among the participants was 29.3%, with grade I (interdental) gingival enlargement being more common and among subjects on long-term use of CCBs in combination with ARBs. All subjects were unaware of drug-induced gingival enlargement in hypertensive patients. There was a negative association between oral hygiene status and drug-induced gingival enlargement.

Keywords: Awareness, gingival enlargement, oral hygiene, dental care service

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INTRODUCTION

Hypertension is a long-term medical condition, in which the blood pressure in the arteries is persistently elevated. [1] It is a prevalent cardiovascular condition, and the increasing burden of hypertension in Nigeria has led to long-term and widespread use of antihypertensive medications. Antihypertensive drugs are classified into seven different groups. They include diuretics, beta-blockers (BB), alpha-blockers, calcium channel blockers (CCB), angiotensin-converting enzyme inhibitors (ACEIs), angiotensin II receptor blockers (ARBs) and central effect drugs. [2, 3] However, the side effects of these drugs, including gingival enlargement, can significantly impact patients' oral health, leading to discomfort, difficulty in maintaining oral hygiene, aesthetic concerns and even periodontal complications. [2, 4]

Gingival enlargement or gingival overgrowth is an increase in the size of the gingiva, because of the collagenous extracellular matrix that accumulates within the gingival connective tissue with various degrees of inflammation.[5] It was reported that the disorders seem to be induced by the disruption of homeostasis of collagen synthesis and degradation in the gingival connective tissue, predominantly through the inhibition of collagen phagocytosis of gingival fibroblasts.[6] Gingival enlargement may be idiopathic or associated with a variety of factors like congenital diseases, hormonal disturbances, long-term poor oral hygiene, inflammation, neoplastic conditions and adverse drug reactions. Gingival enlargements have been classified based on aetiology into five general groups; inflammatory enlargement, enlargement associated with systemic diseases or conditions. neoplastic enlargement, false enlargement, and drug induced enlargement.[7]

Drug Induced Gingival Enlargement (DIGE), also known as "Drug Influenced Gingival Overgrowth (DIGO) is defined as gingival enlargement as a result of adverse drug reaction, [8] and typically occurs within 3-months after commencement of treatment for hypertension. [4] DIGE appears to be more prevalent in younger age groups with a predilection for the anterior gingival tissue and is usually not associated with attachment loss or tooth mobility unless there is an existing periodontal disease. It starts as an overgrowth in the interdental papilla and gradually extends coronally. [4,9] Some medications currently associated with gingival enlargement are anticonvulsants (phenytoin), antihypertensive drugs like calcium channel blockers (nifedipine and amlodipine) and immunosuppressants (cyclosporine A and tacrolimus).[2,5,10] Of all cases of DIGO, about 50% are attributed to phenytoin, 30% to cyclosporine and the remaining 10-20% to calcium channel blockers. [11]

Drug-induced enlargement has been associated with a patient's genetic predisposition, and its association with inflammation is debated. Some investigators assert that underlying inflammation is necessary for the development of drug-induced enlargement, while others purport that the existing enlargement induced by the drug effect compounds plaque retention, thus furthering the tissue response. Careful attention to oral hygiene may reduce the severity of gingival enlargement; most times, discontinuing the culprit drug resolves the enlargement.[12]

Studies have been conducted in Nigeria, which reported an increased prevalence of gingival enlargement among patients on calcium channel blockers. [13, 14] However, there is paucity in literature of the awareness and severity of gingival enlargement among hypertensive patients within the Nigerian population, particularly in Port Harcourt. Hence, this study aims to assess the awareness and prevalence of drug-induced gingival enlargement, the oral hygiene status of hypertensive participants on different antihypertensive medications Also, to assess the association between dental care service (scaling and polishing) and drug-induced gingival enlargement amongst hypertensive patients attending the Cardiology Clinic, University of Port Harcourt Teaching Hospital (UPTH).

MATERIALS AND METHODS

This was a cross-sectional hospital-based study that was conducted among hypertensive patients who had been on antihypertensive drugs for at least 6 months attending the Cardiology unit of the University of Port Harcourt Teaching Hospital between May and June 2025. Ethical approval was obtained from

the UPTH Research Ethics Committee (UPTH/ADM/90/S.11/VOL.XI/1897), and informed consent was obtained from all participants before data collection. Confidentiality and anonymity of participants were maintained. Consecutive patient who met the inclusion criteria and gave consent were recruited into this study until the sample size was reached.

Inclusion criteria included patients diagnosed with hypertension and on antihypertensive drugs (CCB, ACEI, Beta blocker, combination therapy) for at least 6months, patients aged 18years and above, patients with existence of 10 or more anterior teeth and a minimum of 16 permanent teeth and who provided informed consent. Exclusion criteria included patients on immunosuppressants or anticonvulsants, which are also known to cause gingival enlargement. Patients with systemic diseases that could affect gingival health (diabetes mellitus), as well as patients on antihypertensive drugs, who did not give consent.

The sample size was determined using the formula; $N = \frac{Z^2 PQ}{d^2}$

Where; Z is confidence level = 1.96

P is proportion which is 10.5% (0.105) [13]

Q is equal to 1-P (0.895)

d is the degree of freedom = 0.05

The sample size is 150

An interviewer-administered questionnaire was used to get socio-demographic information as well as medical and drug histories, which were confirmed from patients' case records.

Greene and Vermillion Oral Hygiene Index was used to assess oral hygiene status[15] and Simplified Oral Hygiene Index (OHI-S) was calculated and recorded as: Good: 0 - 1.2, fair: 1.3- 3.0, and poor: 3.1- 6.0. The New Clinical Index for Gingival Enlargement[16] was used to assess gingival enlargement and graded based on severity of gingival enlargement as: Grade 0: No gingival enlargement, Grade 1: enlargement confined to the interdental papilla or blunting of the gingival margin, Grade II: enlargement involving the papilla and the marginal gingiva or covers up to one-third of the clinical crown, Grade III: enlargement extends to and covers more than one-third of the clinical crown.

Data were collected by two examiners and the Cohen's kappa coefficient for Simplified Oral Hygiene Index (OHI-S) and New Clinical Index for gingival enlargement was 0.84.

Statistical analysis

Statistical analysis was done using the Statistical Product and Service Solution (SPSS) version 25.0 (IBM SPSS Inc., Chicago, Illinois). Continuous variables were expressed as means and standard deviations, while categorical variables were expressed as frequencies with accompanying percentages. Differences between groups were compared using the Chi-square tests for categorical variables. P value <0.05 was considered statistically significant.

RESULTS

Sociodemographic of subjects

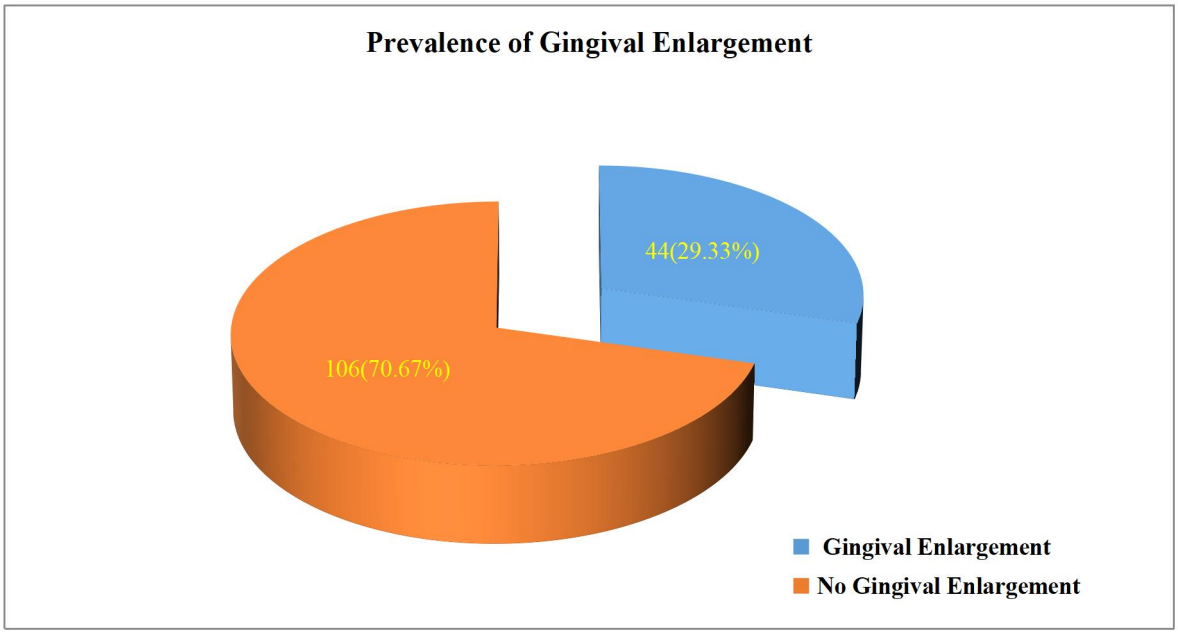
Table 1 shows one hundred and fifty (150) respondents; the age range of the population was 41-75 years. There were 64 males and 86 females, with an M: F of 1:1.25. Most of the males (67.2%) had tertiary education, while half of the females (50.0%) had primary school education. Most males (73.4%) were retirees, while more than half of the females (54.7%) were farmers.

Table 1: Sociodemographic of subjects

Variables		MALE n (%)	FEMALE n (%)
Age range	41-45	1 (1.6)	2 (2.3)
	46-50	1 (1.6)	1 (1.2)
	51-55	33 (51.6)	5 (5.8)
	56-60	7 (10.9)	34 (39.5)
	61-65	3 (4.7)	1 (1.2)
	66-70	3 (4.7)	2 (2.3)
	≥71	16 (25.0)	41 (47.7)
Educational Status	No Formal Education	0 (0.0)	2 (2.3)
	Primary	0 (0.0)	43 (50.0)
	Secondary	21 (32.8)	25 (29.1)
	Tertiary	43 (67.2)	16 (18.6)
Occupation	Unemployed	0 (0.0)	1 (1.2)
	Civil Service	11 (17.2)	3 (1.50
	Business	3 (4.7)	32 (37.2)
	Farming	1 (1.6)	47 (54.7)
	Teaching	1 (1.6)	1 (1.2)
	Retiree	47 (73.4)	2 (2.3)
	Clergy	1 (1.6)	0 (0.0)
Marital Status	Single	0 (0.0)	3 (3.5)
	Married	63 (98.4)	23 (26.8)
	Divorced	1 (1.6)	1 (1.2)
	Widow/Widower	0 (0.0)	59 (68.6)
	Total	**64 (100.0)**	**86 (100.0)**

Prevalence of gingival enlargement amongst the participants

Figure 1 shows that the prevalence of gingival enlargement amongst the subjects was 29.3%.



Distribution of antihypertensive medications history and gingival enlargement among subjects

Table 2 shows that one participant (2.3%) who used calcium channel blockers and angiotensin II receptor blocker within 1 year, had gingival enlargement in the in interdental and marginal gingiva (grade 2), 21(47.7%) and 2 (4.5%) participants who used calcium channel blockers (CCB) and angiotensin II receptor blocker within 1 to 5 years presented with gingival enlargement in the interdental gingiva (grade 1), and grade 2 gingival enlargement respectively. Fifteen (34.1%) of participants who used calcium channel blockers and angiotensin II receptor blocker within 6 – 10 years, had grade 1 gingival enlargement, while 1 (2.3%) participant each who used calcium channel blockers & angiotensin II receptor blocker, and calcium channel blocker & ACE inhibitor for > 10 years had grade 1 gingival enlargement.

Table 2: Distribution of antihypertensive medications history and gingival enlargement among subjects

Duration of antihypertensive medication use (years)	Type of antihypertensive medication	Site of gingival enlargement	Frequency (%)
< 1	Calcium channel blocker (Amlodipine), Angiotensin II receptor blocker (Telmisartan)	Interdental and Margin (Grade 2)	1 (2.3)
1-5	Calcium channel blocker (Amlodipine) alone	Interdental and marginal (Grade 2)	1 (2.3)
	Calcium channel blocker (Amlodipine), Angiotensin II receptor blocker (Telmisartan)	Interdental (Grade 1)	21 (47.7)
		Interdental and marginal (Grade 2)	2 (4.5)
	Angiotensin II receptor blocker (Telmisartan) alone	Interdental (Grade 1)	1 (2.3)
6-10	Calcium channel blocker (Amlodipine), Angiotensin II receptor blocker (Telmisartan)	Interdental (Grade 1)	15 (34.1)
>10	Calcium channel blocker (Amlodipine), Angiotensin II receptor blocker (Telmisartan)	Interdental (Grade 1)	1 (2.3)
		Interdental and marginal (Grade 2)	1 (2.3)
	Calcium channel blocker (Amlodipine) and ACE inhibitor (Lisinopril)	Interdental (Grade 1)	1 (2.3)
		Total	44 (100.0)

Awareness of drug- induced gingival enlargement, oral hygiene status and scaling & polishing amongst subjects based on gender

Table 3 shows that none of the subjects was aware of drug-induced gingival enlargement among hypertensive patients (p = 0.006).

Considering the oral hygiene status, 43 (100.0%) of females had poor oral hygiene. Among participants with fair oral hygiene, 36 (73.5%) were males and 13 (26.5%) were females, while among those with good oral hygiene, 28 (48.3%) were males and 30 (51.7%) were females. This finding is statistically significant (p = 0.000).

Concerning scaling and polishing, 27 (24.8%) males and 82 (75.2%) females have not done scaling and polishing, while 37 (90.2%) males and 4 (9.8%) females had done scaling and polishing. This finding is statistically significant (p = 0.000).

Table 3: Awareness of drug- induced gingival enlargement, oral hygiene status and scaling & polishing amongst subjects based on gender

Variables		Gender		P values
		Males n (%)	Females n (%)	
Awareness of drug-induced gingival enlargement	Yes	0 (0.0)	0 (0.0)	**0.006***
	No	64 (43.7)	86 (57.3)	
Simplified Oral Hygiene status (OHI-S)	Poor	0 (0.0)	43 (100.0)	**0.000***
	Fair	36 (73.5)	13 (26.5)	
	Good	28 (48.3)	30 (51.7)	
Scaling and polishing	No	27 (24.8)	82 (75.2)	**0.000***
	Yes	37 (90.2)	4 (9.8)	

*Significant

Relationships between gender, level of education, type of antihypertensive medications, awareness of drug-induced gingival enlargement, scaling & polishing and Oral Hygiene Status (OHI-S)

Table 4 shows that 28 (43.8%) and 36 (56.3%) males had good and fair oral hygiene respectively, while 30 (34.9%), 13 (15.1%) and 43 (50.0) females presented with good, fair and poor oral hygiene, respectively. This finding is statistically significant (p =0.000). Concerning type of antihypertensive medications used, among participants on combination therapy with no calcium channel blocker; 1 (2.1%), 4 (8.5%) and 42 (89.4%) had good, fair and poor oral hygiene, respectively. Among participants on combination therapy of calcium channel blockers and angiotensin II receptor blockers; 48 (54.5%), 39 (44.3%) and 1 (1.1%) had good, fair and poor oral hygiene, respectively. This finding is statistically significant. (p = 0.000). Regarding scaling and polishing, among participants who had never done scaling and polishing; 53 (48.6%), 14 (12.8%) and 42 (38.5%) presented with good, fair and poor oral hygiene respectively, while among those who have done scaling and polishing; 5 (12.25%), 35 (85.4%) and 1 (2.4%) had good, fair and poor oral hygiene respectively. This finding is statistically significant. (p = 0.000).

Table 4: Relationships between gender, level of education, type of antihypertensive medications, awareness of drug-induced gingival enlargement, scaling & polishing and Simplified Oral Hygiene Status (OHI-S)

Variables		Oral Hygiene Status			
		Good n (%)	**Fair n (%)**	**Poor n (%)**	**P value**
Gender	Males	28 (43.8)	36 (56.3)	0 (0.0)	**0.000***
	Females	30 (34.9)	13 (15.1)	43 (50.0)	
Level of Education	None	2 (100.0)	0 (0.0)	0 (0.0)	**0.000***#
	Primary	1 (2.3)	2 (4.5)	41 (93.2)	
	Secondary	43 (91.5)	4 (8.5)	0 (0.0)	
	Tertiary	12 (21.1)	43 (75.4)	2 (3.5)	
Type of antihypertensive medications	No CCB	1 (2.1)	4 (8.5)	42 (89.4)	**0.000***
	CCB alone	6 (60.0)	4 (40.0)	0 (0.0)	
	CCB, ACEI, Diuretics	2 (66.7)	1 (33.3)	0 (0.0)	
	CCB, BB, Diuretics	1 (50.0)	1 (50.0)	0 (0.0)	
	CCB, ARB	48 (54.5)	39 (44.3)	1 (1.1)	
Awareness of drug-induced gingival enlargement	No	58 (38.7)	49 (32.7)	43 (28.7)	0.613#
	Yes	0 (0.0)	0 (0.0)	0 (0.0)	
Scaling and polishing	No	53 (48.6)	14 (12.8)	42 (38.5)	**0.000***
	Yes	5 (12.2)	35 (85.4)	1(2.4)	

BB -Beta -blockers, CCB - Calcium channel blockers, ACEI - Angiotensin-converting enzyme inhibitors, ARB - Angiotensin II receptor blockers
*significant #Fisher's exact

Relationships between gender, level of education, type of antihypertensive medications, awareness of drug-induced gingival enlargement, scaling & polishing and new clinical index for gingival enlargement.

Table 5 shows that 60 (69.8%), 22 (25.6%) and 4 (4.7%) males had grade 0, grade 1 and grade 2 gingival enlargement respectively, while 46 (71.9%), 17 (26.6%) and 1 (1.6%) females presented with grade 0, grade 1, grade 2 gingival enlargement respectively. This finding is not statistically significant (p = 0.581).

Considering type of antihypertensive medication, among participants who use combination therapy with no calcium channel blockers; 46 (97.9%), 1 (2.1%) participants had grade 0 and grade 1 gingival enlargement respectively, among those on calcium channel blocker alone; 9 (90.0%) and 1 (10.0%) participants had grade 0 and grade 2 gingival enlargement respectively, while among those on calcium channel blockers and angiotensin 11 receptor blockers; 47 (53.4%), 37 (47.0%) and 4 (4.5%) had grade 0, grade I and grade II gingival enlargement respectively. This finding is statistically significant (p = 0.000).

Concerning scaling and polishing, among participants who have not done scaling and polishing; 68 (62.4%), 38 (34.9%) and 3 (2.8%) participants had grade 0, grade I and grade II gingival enlargement respectively, while among those that have done scaling and polishing; 38 (92.7%), 1 (2.4%) and 2 (4.9%) participants presented with grade 0, grade I and grade II gingival enlargement respectively. This finding is statistically significant (p = 0.000).

Table 5: Relationships between gender, level of education, type of antihypertensive medications, awareness of drug-induced gingival enlargement, scaling & polishing and new clinical index for gingival enlargement.

Variables		Grade of Gingival Enlargement			P value
		Grade 0 n (%)	Grade I n (%)	Grade II n (%)	
Gender	Males	60 (69.8)	22 (25.6)	4 (4.7)	0.581
	Females	46 (71.9)	17 (26.6)	1 (1.6)	
Level of Education	None	2 (100.0)	0 (0.0)	0 (0.0)	0.000*#
	Primary	44 (100.0)	0 (0.0)	0 (0.0)	
	Secondary	8 (17.0)	37 (78.7)	2 (4.3)	
	Tertiary	56 (91.8)	2 (3.3)	3 (4.90)	
Type of antihypertensive medications	No CCB	46 (97.9)	1 (2.1)	0 (0.0)	0.000*#
	CCB alone	9 (90.0)	0 (0.0)	1 (10.0)	
	CCB, ACEI, Diuretics	2 (66.6)	1 (33.3)	0 (0.0)	
	CCB, BB, Diuretics	2 (100.0)	0 (0.0)	0 (0.0)	
	CCB, ARB	47 (53.4)	37 (42.0)	4 (4.5)	
Awareness of drug-induced gingival enlargement	No	106 (70.0)	39 (26.00)	5 (3.3)	0.923#
	Yes	0 (0.0)	0 (0.0)	0 (0.0)	
Scaling and polishing	No	68 (62.4)	38 (34.9)	3 (2.8)	0.000#
	Yes	38 (92.7)	1 (2.4)	2 (4.9)	

BB-Beta -blockers, CCB - Calcium channel blockers, ACEI - Angiotensin-converting enzyme inhibitors, ARB - Angiotensin II receptor blockers
*significant #Fisher's exact

Relationship between oral hygiene status and gingival enlargement

Table 6 shows that among participants with good oral hygiene, 37 (88.1%) and 5 (11.9%) participants had grade 1 and grade II gingival enlargement respectively, while among those with fair oral hygiene, 2 (100.0%) had grade I gingival enlargement. The odds of the outcome (gingival enlargement) occurring were lower in those with good oral hygiene (OR = 0.881, 95% CI [0.788, 0.985]) (p = 0.783). Despite the 95% confidence interval not containing the null value of 1, the results did not achieve statistical significance at the conventional $\alpha = 0.05$ level.

Table 6: Relationship between oral hygiene status (ohi-s) and gingival enlargement

Variables		Gingival Enlargement					P value
		Grade I n (%)	Grade II n (%)	Total n (%)	Odds Ratio	Confident Interval (CI)	
Oral Hygiene Status	Good	37 (88.1)	5 (11.9)	42 (95.5)	0.881	0.788 -0.985	0.783
	Fair	2 (100.0)	0 (0.0)	2 (4.5)			
	Total	39 (88.6)	5 (11.4)	44 (100.0)			

DISCUSSION

A closer look at the demographics shows an ageing population of hypertensive patients, with most females (47.67%) being over 71years of age, whereas most males (51.56%) were within the age 51-55 range. This finding is in tandem with the report that below 60 years, men have a higher incidence of hypertension, while above 60 years, postmenopausal women have a higher incidence of hypertension, because of hormonal changes and increased risk factors such as hysterectomy or oophorectomy. [17, 18]

The prevalence of gingival enlargement among participants was 29.3%. This finding is higher than that of another study, which reported a prevalence of 10.5%, [13] but lower than another study, which reported a prevalence of 49.5%.[14] These disparities may be because of differences in population demographics, oral hygiene habits, age distribution and genetic predisposition. It may also be because of the type and combination of antihypertensive drugs. Also, interdental enlargement was the most common form, and among participants that have on the medication for 1-5 years and 6 -10 years. This could be because dental plaque starts in the interdental area, [19] this points to a need for dental assessment among hypertensive patients on long-term medication.

Shockingly, none of the participants was aware that antihypertensive medications could cause gingival enlargement, this reflects a glaring knowledge gap, understanding the need for better patient education, as well as poor utilization of preventive dental care, which is a consistent barrier in low- and middle-income country (LMIC) populations. [20] This may be because of low health literacy and accessibility issues; also, many correspondents are retirees and farmers. This calls for better patient education, as it has also been reported that unchecked gingival enlargement impairs oral hygiene practices, speech, mastication, aesthetics, self-esteem, and can eventually lead to periodontal degradation and tooth loss.[21]

In terms of oral hygiene status among gender, more females presented with poor oral hygiene, while more males had fair oral hygiene, which correlates with the prevalence of gingival enlargement. This aligns with the consensus in the literature that poor plaque control is a strong modifying factor in drug-induced gingival enlargement, as plaque acts as a local irritant, augmenting the tissue's response to medications that cause fibroblast proliferation.[22] More of the females never had scaling and polishing done, while majority of the males had done scaling and polishing. This finding is contrary to what is known, as females are known to visit the dental clinic more than males, [23] however, the finding in this study could be because the majority of females in this study are mainly farmers, who could not afford dental treatment, as out-of-pocket payment for dental care could affect their finances leading to further impoverishment. Hence, policy makers should include dental care as part of universal health care and advocate for the inclusion of dental care coverage in health insurance packages.[24]

Comparing oral hygiene status with other variables, there was a statistically significant difference between gender, level of education, type of antihypertensive medication and scaling and polishing, and oral hygiene status, however, level of awareness was not statistically associated with oral hygiene status; this suggests that knowledge alone may not translate into action without an enabling system (e.g. access, affordability). Regarding the New Clinical Index for Gingival Enlargement, there was a statistically significant difference between level of education, type of antihypertensive medication, scaling and polishing, and grading of gingival enlargement. These findings suggest that better-educated individuals might either experience better oral hygiene status and less severe gingival enlargement or better manage it. These results echo the report in a study by Chen et al. [25] where educational level strongly predicted oral hygiene awareness and practices. Hence, hypertensive patients should be educated on the importance of regular preventive dental care.

Considering the association between oral hygiene status and drug-induced gingival enlargement, there was a higher prevalence of grade 1 (interdental) gingival enlargement among participants with good oral hygiene. This could be because of the limitation of simplified oral hygiene index, which examines only 6 surfaces of 6 selected teeth but does not assess the interproximal/ interdental areas.[26]

Considering the odds ratio and confidential intervals, there was an odds ratio of 0.881 (95% CI 0.788-0.985). An odd ratio of 0.881 indicates a negative association and a 11.9% decrease in odds. Though the p value for the odd ratio was greater than 0.05, the confidence interval is less than 1, suggesting a consistent trend towards reduced odds of the outcome. This indicates a statistically non-significant negative association between oral hygiene status and drug-induced gingival enlargement. However, this finding should be interpreted with caution, as a larger sample size could have produced a smaller p-value and a narrower CI.

CONCLUSION

The prevalence of drug-induced gingival enlargement among the participants was 29.3%, with grade I (interdental) gingival enlargement being more common and among subjects on long-term use of CCBs in combination with ARBs. All subjects were unaware of drug-induced gingival enlargement in hypertensive patients. There was a negative association between oral hygiene status and drug-induced gingival enlargement.

Limitations of this study

The study was limited to individuals attending a single tertiary hospital in Nigeria, which may have introduced selection bias and limited the generalizability of the findings to other populations. Also, periodontal disease was not examined.

Recommendations

A longitudinal study with a larger sample size is recommended, with the assessment of periodontal indices included.

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Nil.

Conflicts of interest

The authors declare no conflict of interest.

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Original Article

Intracranial subdural haematomas: a rare but disabling complication of spinal anaesthesia

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Abstract

Background: Intracranial subdural haematomas (SDH) after subarachnoid blocks (SAB) are a very rare complication, which results in persistence of post procedure headaches and neurologic deterioration. Acute change in CSF pressure dynamics resulting in tears of bridging veins has been implicated.
Aim: To highlight our findings of intracranial SDH following SAB in the period 2018 to 2023 in Port Harcourt.
Methods: Patients who had persistent headaches with neurologic deterioration after SAB had brain imaging done. Those with SDH were recruited. They had burr hole evacuation of haematomas.
Results: Twelve patients (11 females), with a mean age of 41.0±9.8 years were recruited.
Ten patients had SAB, and 2 had Combined spinal epidural (CSE) anaesthesia. SAB was done with size 22G spinal needle in 3 patients and 24G in 5 patients. Confusion, headaches, alteration in consciousness, and paresis occurred in 66.7%, 100%, 75% and 83.3% of patients respectively. 16.7% patients were Mark-Walder grade IV, 8.3% grade III, 41.7% grade II, and 33.3% with grade I. 41.7% patients had bilateral SDH and 33.3% had left SDH. Chronic SDH was noted in 41.7% patients and others had subacute SDH. Mean interval between onset of symptoms to surgery was 6.3±7.3 days. Clinical recoveries were noted in all patients with postoperative modified Rankin Scale (mRS) scores at 14 days of 0.
Conclusion: Intracranial subdural haematomas may be rare but are a major cause of headaches with neurologic deteriorations after subarachnoid blocks. A high index of suspicion and prompt management results in good outcomes.

Keywords: Subdural haematoma, subarachnoid block, CSE, Mark-Walder grading, burr hole haematoma evacuation, mRS

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INTRODUCTION

Spinal and Epidural anaesthesia are safe and effective alternatives to general anaesthesia for surgeries in the lower abdomen, lumbar, sacral and lower limb regions of the body.[1, 2] Although regarded as low risk, they are not without complications. Common complications include hypotension, post-dural puncture headache (PDPH), and transient neurological symptoms.[3, 4] Intracranial

subdural haematomas are a rare but life-threatening complication following spinal/epidural anaesthesia. A possible explanation for this is the alteration in CSF pressure dynamics with continued CSF leak from the subarachnoid space following spinal dural puncture. This leads to lower intracranial pressure, tearing of bridging dural veins, which results in subdural haematoma.[5, 6, 7, 8] This explanation mirrors the aetiology of post-dural puncture headache (PDPH), which is benign and self-limiting, usually managed with bed rest, hydration, and simple analgesics, and the incidence and severity correlate well with the needle size and tip design.[9, 10] However, if features of PDPH are prolonged or if there is prolonged alteration in consciousness, development of personality changes, onset of seizures, or other features of a focal neurologic deficit, the presence of the rarer but more fatal intracranial subdural haematoma or other intracranial haemorrhages should be considered.[11, 12] A search through the literature revealed that fewer than one hundred such cases have been reported.[13, 14] It is believed that this is below what it should be, as some cases may not be radiologically diagnosed. Due to its potentially fatal implications, a high index of suspicion should be maintained. PDPH and post-neuraxial anaesthesia intracranial subdural haematoma could be prevented by using the smallest possible spinal pencil-point needles.[15]

This study aimed to bring to the fore our experience with spinal anaesthesia complicated by intracranial subdural haematoma between the years 2018 and 2023.

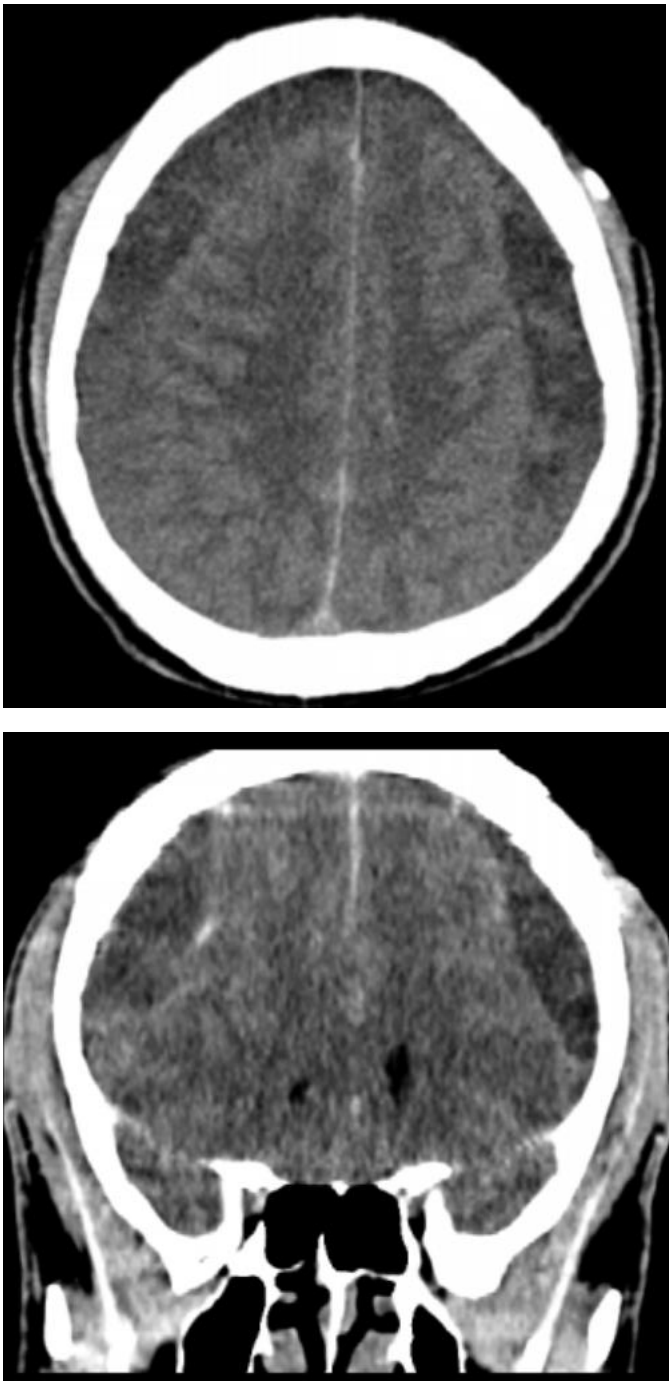


Figure 1. Brain CT scan showing bilateral chronic subdural haematoma in axial (A) and coronal (B) views.

MATERIALS AND METHODS

Study design

This research employed a retrospective descriptive design involving a review of existing hospital records. The approach was suitable for examining documented cases of intracranial subdural haematoma (SDH) that occurred following neuraxial anaesthesia, allowing for the identification of patient characteristics, risk factors, management, and outcomes over time.

Study location

The study was conducted in Rivers State, Nigeria, across selected secondary and tertiary healthcare facilities where neuraxial anaesthesia is routinely performed for surgical, obstetric, and orthopaedic procedures. These facilities were chosen based on their availability of detailed anaesthetic and neurosurgical records.

Study period

Hospital data were reviewed for a six-year period, spanning January 2018 to December 2023. This timeframe was selected to ensure adequate case retrieval and to observe any trends in the occurrence and management of subdural haematomas following neuraxial anaesthesia.

Study population

The study population consisted of patients who developed intracranial subdural haematoma after receiving subarachnoid (spinal) or epidural anaesthesia during the study period. Only patients who required surgical intervention for the haematoma were included in the study.

Inclusion criteria

This study included patients with available and legible hospital records who underwent subarachnoid or epidural anaesthesia between 2018 and 2023 with documented complication of intracranial subdural haematoma confirmed by CT or MRI imaging, who required and received surgical management for the haematoma.

Exclusion criteria

Patients excluded were those with pre-existing intracranial pathology before the anaesthetic procedure, incomplete, missing, or illegible medical records, and cases where the diagnosis of subdural haematoma was not confirmed radiologically.

Data collection procedure

Eligible cases were identified through the anaesthetic, neurosurgical, and medical records departments of the participating hospitals. Relevant information was retrieved from theatre logs, anaesthetic charts, patient case notes, and radiology reports.

A structured data collection form was used to extract information on:

Demographic data: age, sex, and indication for anaesthesia.

Anaesthetic details: type of neuraxial block, level of puncture, and size of spinal needle.

Clinical data: comorbid illnesses, anticoagulants use, onset and type of neurological symptoms, timing of diagnosis, and imaging results.

Management details: type of surgical intervention, perioperative complications, and outcomes.

Each case record was assigned a unique code to ensure confidentiality and prevent duplication.

Data analysis

All collected data were entered and analysed using the Statistical Package for the Social Sciences (SPSS), version 29.0 (IBM Corp., 2023, Armonk, New York, United States of America). Descriptive statistics (frequencies, percentages, means, and standard deviations) were computed to summarize patient characteristics and clinical variables.

Ethical considerations

Ethical approval for this study was obtained and further permissions were granted by the management of the participating hospitals.

All patient identifiers were removed during data extraction, and confidentiality was strictly maintained. The study adhered to the principles outlined in the Declaration of Helsinki (2013) regarding ethical standards for research involving human data.

RESULTS

This case series consisted of twelve (12) reports and while 11(91.7%) were female, 1 (8.3%) person was a male with a mean age of 41.0±9.8 years (range 28 to 62 years), and whereas 8(66.7%) persons were less than 40years of age, 3(25.0%) were in the 40 to 60years age group and 1(8.3%) person was older than 60years.

Ten patients had SAB, and 2 had Combined spinal epidural (CSE) anaesthesia. SAB was done with size 22G spinal needle in 3 patients and 24G in 5 patients.

Headaches as a presenting complaint were reported by all 12(100%) patients, and other complaints included confusion and loss of consciousness, as shown in Figure 1.

Two (16.7%) cases reported symptoms after epidural anaesthesia with a 16-gauge (16G) needle while 9(75.0%) developed symptoms after spinal anaesthesia with a 22G Quincke needle in 3(25.0%) and a 24G Quincke needle in 5(41.7%) females, however, the size of the needle used for anaesthesia in one person was unknown. The only male case reported symptoms after a caudal block and the size of the needle was also unknown. The interval from symptom onset to brain imaging ranged from 1 day to 25 days with a mean of 8.1±6.5 days and a median of 7days (IQR was 4.25 to 11.0 days) and while all the patients were eventually referred for neurosurgical review, there was a delay in this referral with a median of 5.5 days (IQR of 2.0 to 9.5 days) before referral (range 1 to 22 days) (mean 6.8±6.2days).

The result of brain imaging revealed bilateral subdural haemorrhage in 5(41.7%) persons while the remaining patients had unilateral subdural haemorrhage as shown in Table 1.

Half of the participants (6 persons) were hypertensives, but no person was living with diabetes mellitus or was on anticoagulants or antiplatelets in any form. None of the participants gave a prior precipitating history of a road traffic accident, fall or assault.

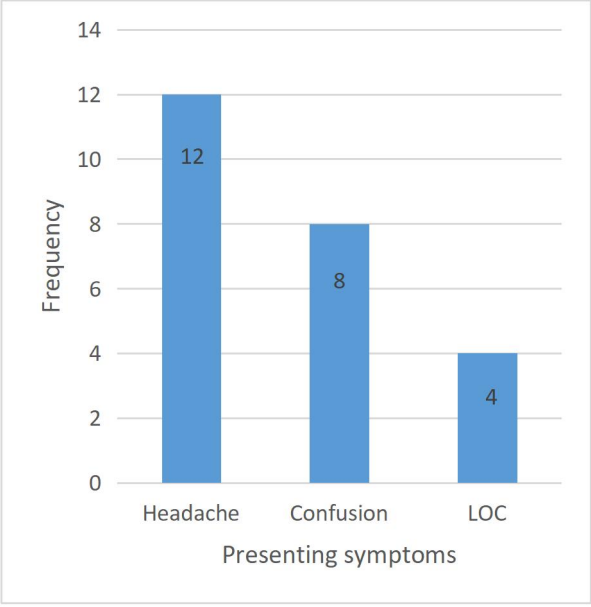
On examination of the patients at neurosurgical consultation, the mean GCS score was 11±6.6, with a range of 3 to 15 (median =13.0, IQR= 10.0 to 15.0), 6 (50.0%) persons had cranial nerve VII weakness, 6(50.0%) had hemiparesis (3 on the right side and 3 on the left side) and 4(33.3%) had tetraparesis, while 2(16.7%) persons did not have any limb weakness. The Mark Walder grading at presentation of the cases is shown in Table 2.

All the patients had a burr hole with a drain inserted. Five (41.7%) persons had bilateral burr holes, 7(58.3%) had unilateral burr holes (4 on the left and 3 on the right).

The interval from symptom onset to neurosurgical intervention ranged from 1 to 28 days, with a mean of 6.3±7.3 days and a median of 4 days (IQR was 2.25 to 6.75 days). All 12 cases had excellent outcomes and were alive after intervention with no new signs and symptoms, normal speech, full power in all limbs and a GCS of 15. All patients were able to perform basic activities of daily living, with a modified Rankin Scale score of 0, at discharge from hospital after a mean duration of hospital stay of 5.3±1.1 days (range was 4 to 7 days).

Follow up consultation was done until 6 months. All 12(100%) patients were fully healthy and returned to normal daily routines with no reported history of confusion up to 6 months post-neurosurgical intervention.

Figure 2. Frequency of various presenting complaints



*Key: LOC= loss of consciousness

Table 1. Brain imaging findings in the study population

Brain image finding	Frequency	Percent
Bilateral CSDH	1	8.3
Bilateral SASDH	4	33.3
Left CSDH	3	25.0
Left SASDH	1	8.3
Right CSDH	1	8.3
Right SASDH	2	16.7
Total	12	100

Table 2. Mark Walder grade at presentation of the patients

Grade	Frequency	Percent
I	4	33.3
II	5	41.7
III	1	8.3
IV	2	16.7
Total	12	100

DISCUSSION

Subarachnoid and Epidural blocks are safe methods of anaesthesia; they have the advantage of avoiding airway manipulation, polypharmacy and early bonding with baby in obstetrics, but have complications such as hypotension, post-dural puncture headache, nerve damage, meningitis, and intracranial haematomas. Intracranial subdural haematoma is a rare complication that can occur after spinal anaesthesia and epidural anaesthesia. This can also follow lumbar puncture, myelography, epidural steroid injection, and after implantation of an intrathecal drug delivery device and a spinal cord stimulator. It could be acute, subacute or chronic, and all could be potentially fatal.[16, 17, 18, 19]

This study included twelve participants, eleven of whom were females. This female predominance may be related to the increased number of females who have neuraxial anaesthesia for obstetric and gynaecologic procedures in Port Harcourt. The mean age was 41.0±9.8 years, also in keeping with a young population, although chronic subdural haematoma is known to be more common in the elderly population who have brain atrophy.[20, 21]

The mechanism of PDPH and intracranial subdural haematoma is unknown, but it is postulated to be from leakage of cerebrospinal fluid (CSF) from the dural puncture hole. CSF loss is thought to reduce both intraspinal and intracranial pressures, leading to a caudally directed movement of the spinal cord and brain. The sudden reduction in the CSF volume may activate adenosine receptors, leading to arterial and venous vasodilatation, presenting with symptoms of PDPH. If the traction exerted on the bridging veins is significant, it may cause a rupture, leading to haematoma formation.[14, 22]

Moore *et al* attributed the occurrence of intracranial subdural haematomas to the size of the neuraxial anaesthesia needle used with larger needle sizes associated with increased risk of post-neuraxial anaesthesia sequelae.[14] Bos *et al* also reported that larger spinal needles were more likely to result in increased spinal CSF leak that could result directly or indirectly in intracranial subdural haematoma.[23] The size of needles used was documented in 10 out of the 12 patients. Five patients had 24G needles, three had 22G needles, and others had 16G needles used. Flaaten *et al* reported no occurrence of headaches in their study with 29G needles, compared with 26G needles.[24] Halpern *et al* reported that the smallest needles should be used for spinal anaesthesia, and noncutting needles should be used in patients at risk for PDPH.[25] The difficulties experienced by the anaesthetists, viz-a-viz number of attempts with neuraxial anaesthesia were not reported.

All twelve patients had headaches of varying severity. This is similar to what Bos *et al* observed were virtually all patients reported headaches.[23] The differential diagnoses of severe headache after spinal anaesthesia include post-dural puncture headache, subdural haematoma, migraine, meningitis, drug-induced headache, and intracranial pathologies (sinus venous thrombosis, arteriovenous malformations). Maintaining a high index of suspicion and performing early neuroimaging for patients with persistent

headaches can be lifesaving. The International Headache Society developed a list of criteria to differentiate PDPH from other fatal complications of dural puncture.[26] In PDPH, the headache starts within 15 minutes of sitting upright and improves on lying down, or within 5 days after the puncture and resolves spontaneously in a week, or up to 48 hours after an epidural blood patch is administered. If the presentation does not follow these criteria, and the patient develops other neurologic symptoms like vomiting, blurring of vision, drowsiness, and disorientation, then imaging modalities like brain CT scan, MRI, and angiography should be considered. Eight (66.7%) patients presented with confusion, four (33.3%) patients presented with loss of consciousness, six patients had facial nerve palsy, six patients had hemiparesis, and four patients were tetraparetic. All these neurologic features prompted neuroimaging in our patients.

The median interval from the onset of neurological features to the performance of neuroimaging was 7 days (range 1-25 days), and the median interval between symptom onset and patients' referral to a neurosurgeon was 5.5 days (range 1-22 days). The median interval from neurologic symptom onset to neurosurgical intervention was 4 days (range 1-28 days). These delays may have stemmed from initial management of PDPH by the anaesthetist, a low index of suspicion from medical practitioners who managed these patients primarily, patients' financial constraints and out-of-pocket payments for neuroimaging and care, delay in reporting brain scans due to the few radiologists available, and a reluctance to seek neurosurgical intervention, especially when practitioners felt patients would recover spontaneously. These delays could worsen brain injury and hamper good clinical recovery of patients because we know that TIME IS BRAIN.[27]

Subdural haematoma on the CT scan is seen as a crescent-shaped lesion across the hemispheric convexity, which could be hyperdense when acute, isodense when subacute and hypodense when chronic (Fig. 1). Brain MRI is more sensitive compared to brain CT for the detection of intracranial haemorrhage because with MRI, small tentorial and interhemispheric subdural haematomas can be seen. However, most of our patients had a brain CT scan because it is more readily available, it is cheaper, and the procedure can be done very fast, especially in unstable patients.[28] Our patients' brain scans revealed subacute and chronic subdural haematomas; five were bilateral, four were on the left side, and three were on the right side.

Management of SDH is either surgical or conservative. Subdural haematoma usually causes a progressive neurological deterioration, which requires a surgical evacuation of the haematoma by either craniotomy or burr holes to decrease the intracranial pressure and preserve brain function. Chronic haematoma without mental status changes, seizure activity, absent intracranial mass effect, and the haematoma less than 1cm in thickness causing a midline shift of less than 5mm can be managed conservatively,[29] or by surgical resection of the haematoma, epidural blood patch, or both surgical resection and epidural blood patch.[30, 31, 32, 33] All patients had burr hole haematoma evacuation as previously described. They were made to lie supine for up to 72 hours until the subdural drain was removed. These patients were all fully independent at the time of discharge from the hospital after a mean stay of 5.3±1.1 days, and at six months post op, all patients were fully healthy with a modified Rankin score of 0. This shows that with surgical evacuation of the subdural haematoma, patients stand a good chance of complete recovery. Remarkable outcomes post burr hole haematoma evacuation is not uncommon, and is in keeping with a study done by Markwalder *et al*.[34]

CONCLUSION

Intracranial subdural Haematomas following spinal anaesthesia are rare but potentially fatal disorders that can mimic PDPH. This case series highlights the need for medical practitioners to maintain a high index of suspicion for intracranial subdural haematomas in patients with prolonged headaches and neurologic deficits after neuraxial anaesthesia. Knowledge of the symptoms, ability to differentiate SDH from PDPH, and early neuroimaging will facilitate diagnosis for early intervention, which would avoid irreversible neurologic damage and death.

Audit of clinical practices with respect to neuraxial anaesthesia may need to be done to always ensure continued safety of the process. Smaller spinal needle sizes should be used as much as possible.

Furthermore, adequate interdisciplinary collaboration may shorten the time to neurosurgical interventions in these cases.

Limitation of this study

In this study, anaesthesia was performed by different anaesthetists with various levels of competences. Medical records available did not specify the number of attempts at spinal anaesthesia and the cadre of anaesthetist.

Furthermore, with out-of-pocket payment for medical services very common in Nigeria, not all patients with suspicion of post neuraxial anaesthesia intracranial subdural haematoma are able to afford the required neuroimaging for diagnosis. Perhaps, more patients may have been picked up. Also, patients not referred to the Neurosurgery service were not included in this study.

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Nil

Conflicts of interest

We declare no conflict of interest.

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Original Article

Assessment of medical students' perception of anatomical pathology teaching methods

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Abstract

Background: Anatomical pathology is an essential component of medical training in the 4th year of medical school and the learning process may be impacted by the effectiveness of delivery methods. This study aimed to assess the perception of medical students on the teaching methods in anatomical pathology.
Methods: A descriptive cross-sectional survey was conducted between January 2024 and January 2025 among medical students across four universities in Southern Nigeria: University of Port Harcourt, Bayelsa Medical University, Gregory University, and Niger Delta University. A structured questionnaire was used to collect data on attendance, preferences, and perceptions of different teaching methods. Responses were entered into Microsoft Excel and analysed in SPSS, applying descriptive statistics such as frequencies and percentages. Results were presented in tables and figures for clarity.
Results: A total of 215 students from four the medical schools responded to this study. The majority were in their 5th year of study. Lectures were the preferred teaching method (65.6%), followed by practical demonstrations (26%) and seminar (8.4%). Students rated the quality of pathology lectures as predominantly good. All the practical demonstration tools were said to make Anatomical pathology more understandable. Among interactive study methods, group discussion was the most preferred.
Conclusion: This study revealed a strong preference among medical students for lectures, practical sessions, as well as group discussions in learning Anatomical Pathology. These findings highlight the need for educators and medical education college boards to integrate and strengthen these interactive and hands-on teaching approaches within the anatomical pathology curriculum.

Keywords: Perception, anatomical pathology, lectures, teaching methods, medical students

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INTRODUCTION

Pathology is the study of functional and structural changes in cells, tissues and organs by examining the aetiology, pathogenesis, morphological changes and clinical presentation of the diseases process.[1] Anatomical pathology, a cornerstone of diagnostic medicine, plays a pivotal role in clinical decision-making and the understanding of disease processes by the examination of surgically removed organs, tissues biopsies, bodily fluids, and, in some cases, the whole body (autopsy).[1,2] In medical education, it is one of the four fundamental disciplines in Pathology that includes; Anatomical Pathology, Chemical Pathology, Haematology and Medical Microbiology.

Effective teaching methods in Anatomical Pathology are essential for medical students to develop a strong foundation in pathology and its clinical applications.[3] However, medical students' perceptions of teaching methods can significantly impact their learning outcomes, motivation, and overall educational experience.[4] In addition, opportunities to improve teaching effectiveness may be missed by relying on familiar teaching methods such as lectures.[5]

For medical students, mastering Anatomical Pathology is essential not only for examination purposes but also for developing critical clinical reasoning and diagnostic proficiency.[6] However, teaching the course poses unique challenges due to its complex histological, gross morphological, and clinical correlations.[7] These challenges have prompted educators to adopt various instructional methods, including didactic lectures[8], problem-based learning (PBL),[9] virtual microscopy,[7] digital pathology platforms,[10] team-based learning (TBL),[11] and case-based discussions.[12] In most medical schools, practical exercises are an integral part of pathology coursework, and assessing these practical exercises is important. The extensively applied Objective Structured Practical Examination (OSPE) is popularly used in assessing medical subjects.[13] Other assessment methods include the Objective Structured Clinical Examination (OSCE), Essay questions, and Multiple-Choice Questions (MCQ).

The efficacy of these teaching methods is often judged through student perception, an essential yet underexplored parameter.[14] Student perceptions influence engagement, motivation, and ultimately academic performance.[15] Although numerous teaching approaches have been implemented, few studies in Nigeria have examined how medical students perceive their effectiveness, particularly in relation to learning outcomes and engagement[16,17,18]. This represents a critical research gap in medical education. It is hypothesized that students' preferences for interactive and practical teaching methods are positively associated with higher engagement and improved performance in Anatomical Pathology. Hence, this study aims to evaluate medical students' perceptions of teaching methods in Anatomical Pathology, assessing the strengths, limitations, and areas for improvement. The specific objectives were to determine students' attendance at different teaching sessions, assess their preferences for teaching methods and interactive study approaches, and assess the success rate of medical students in Anatomical pathology.

MATERIALS AND METHODS

This descriptive cross-sectional study was conducted on students from four randomly selected universities in South-South Nigeria, namely the University of Port Harcourt, Bayelsa Medical University, Gregory University, and Niger Delta University out of the fourteen medical colleges in the region. This was a one-year study carried out between January 2024 and January 2025.

A structured questionnaire was used to collect data on attendance, preferences, and perceptions of different teaching methods after obtaining consent from the students.

The inclusion criteria were students currently in the Anatomical Pathology class who had attempted a quiz/test, or students in Anatomical Pathology class who were repeating the year due to failure of the course or who have passed Anatomical Pathology and were now in higher classes.

Students who had not attempted any quiz in Anatomical Pathology, or are unwilling to participate in the study for any reason were exempted from the study.

Instrument development and validation

Data were collected using a structured, self-administered questionnaire developed by the researchers after reviewing relevant literature on medical education and teaching methods in pathology.[3,5] The questionnaire consisted of sections on demographic characteristics, class attendance, preferred teaching methods, and perceptions of effectiveness. The instrument was pre-tested on some medical personnel not included in the study to assess clarity, reliability, and face validity. Minor adjustments were made based on feedback. After obtaining informed consent,

questionnaires were distributed to eligible participants during class sessions and electronically via institutional mailing lists. Participation was voluntary and anonymous.

Data analysis

Data were analyzed using both descriptive and inferential statistics with IBM SPSS Statistics version 29 (IBM Corp., Armonk, N.Y., USA).

Descriptive statistics such as frequencies and percentages were used to summarize students' attendance levels, preferred learning methods, and performance outcomes.

To further explore relationships among variables, Chi-square (χ^2) tests and Pearson correlation analyses were employed.

Ethical clearance

Ethical Clearance was obtained from the Research and Ethics Committee of University of Port Harcourt.

RESULTS

A total of 215 responses were received, specifically; 83 students were from the University of Port Harcourt, 49 from Bayelsa Medical University, 34 from Gregory University, and 49 from Niger Delta University, as shown in Table 1. The females' students were 121 (56.3%) while males were 94 males (43.7%).

The students who partook in the survey were in 400, 500 and 600 level as seen in the Table 2 below with the highest number seen in 500 level.

Student attendance in Anatomical Pathology lectures, practicals, and seminar was assessed across three categories: below 50%, between 50–74%, and above 75%. Overall, most students maintained high attendance (≥75%) in both lectures and practical sessions, while seminar attendance was comparatively lower as seen in Figure 1.

Preferences for the various teaching sessions (lectures, practical, and seminar) were evaluated to determine the most preferred among students. The students noted that lecture was their most preferred teaching method (Figures 2). The students stated how the lectures impacted their interest in Anatomical Pathology with the majority saying that it made them ambivalent (Figure 3). However, the majority (47.9%) of the students said the delivery of the lecture was good (Figure 4), 36.3% said the lecture delivery was average, while 7.9% said it was excellent.

The students were asked about their perceptions of autopsy, slides, and pot demonstrations as regards their training. For the autopsy demonstration, 121 felt it made the course easier to understand and more interesting, 81 said it made no effect in their understanding of the course while 13 said it made it more uninteresting (Figure 5). Slide demonstration was helpful to 144 students, had no effect on 50 students and made 21 students uninterested in the course. Pot demonstration was helpful to 143 students, 58 said it made no difference to them while 14 said it made them more uninterested in the course.

The students were asked to select the most effective interactive teaching method from the following options: group discussions, role-play, simulations, case studies, hands-on activities, online lectures, and collaborative projects. They had the option of choosing more than one interactive teaching method. For group discussions, 132 felt it as useful 122 said case studies were helpful, 92 opted for hands-on activities while the least number of people (14 students) felt online lectures were helpful (Figure 6).

Among the students surveyed, most (166) had passed the Anatomical Pathology course and progressed to higher classes, while 44 were still enrolled, and 5 had yet to pass. Of those who had passed, the majority (150) succeeded on their first attempt, 14 after one resit, and 2 after a second resit. Among students who passed on their first attempt, most scored between 60–69%, indicating generally good academic performance.

Table 1: Nigerian universities participating in the study

Names of Schools	Number of Students	Percentage (%)
University of Port Harcourt	83	38.6
Bayelsa Medical University	49	22.7
Gregory University	34	15.8
Niger Delta University	49	22.7
Total	215	100

Table 2: Participants' distribution by levels of study

Level of students	Number of Students	Percentage
400 Level	44	20.5
500 Level	102	47.4
600 Level	69	32.1
Total	215	100

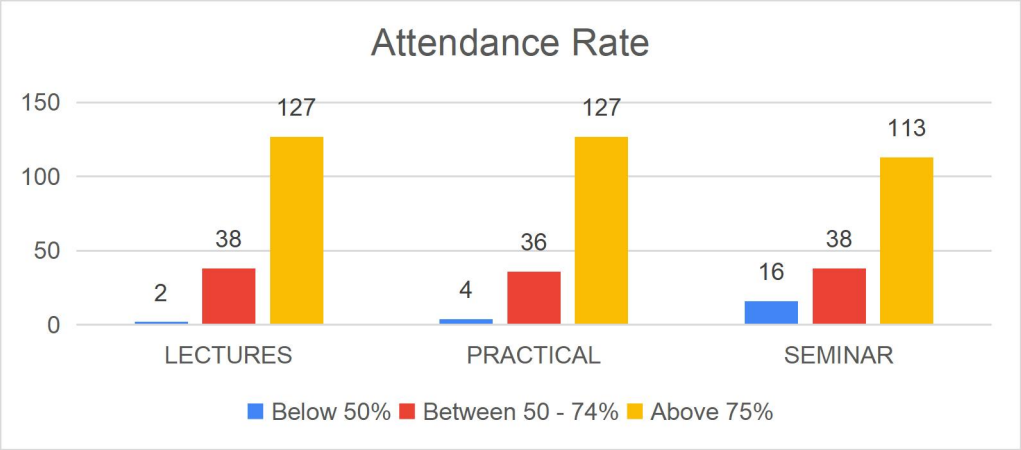

Figure 1: Graph showing attendance of students in anatomical pathology lectures, practical and seminar

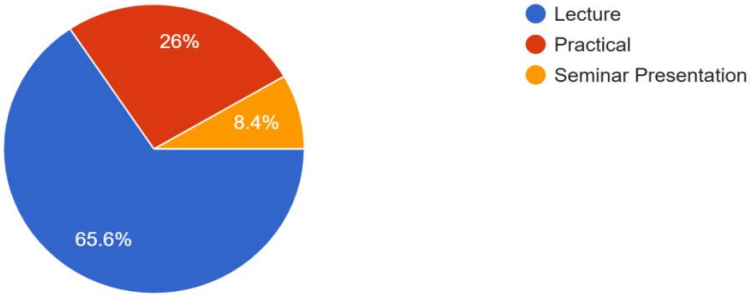

Figure 2: Distribution of preferred teaching methods

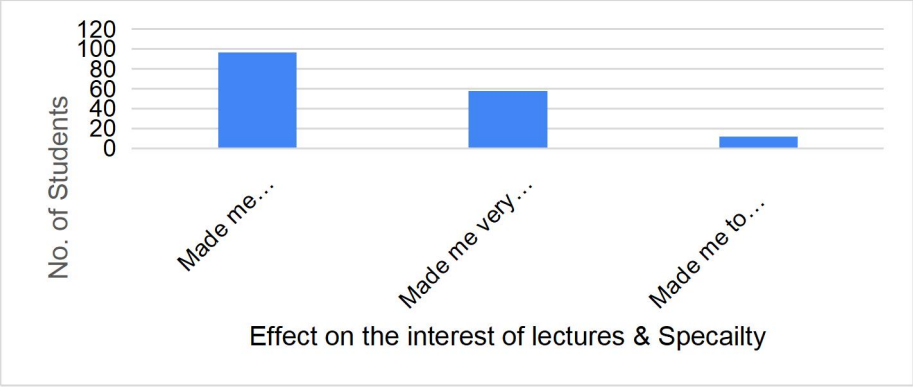

Figure 3: Effect of lecture delivery on students' interest in anatomical pathology

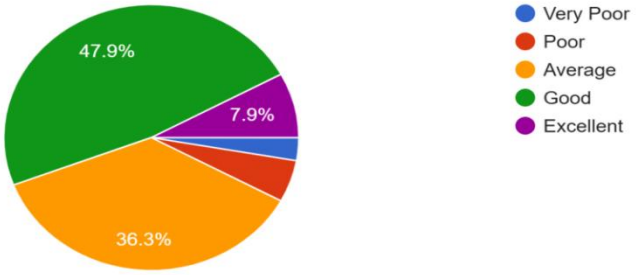

Figure 4: Chart showing anatomical pathology attendance rating

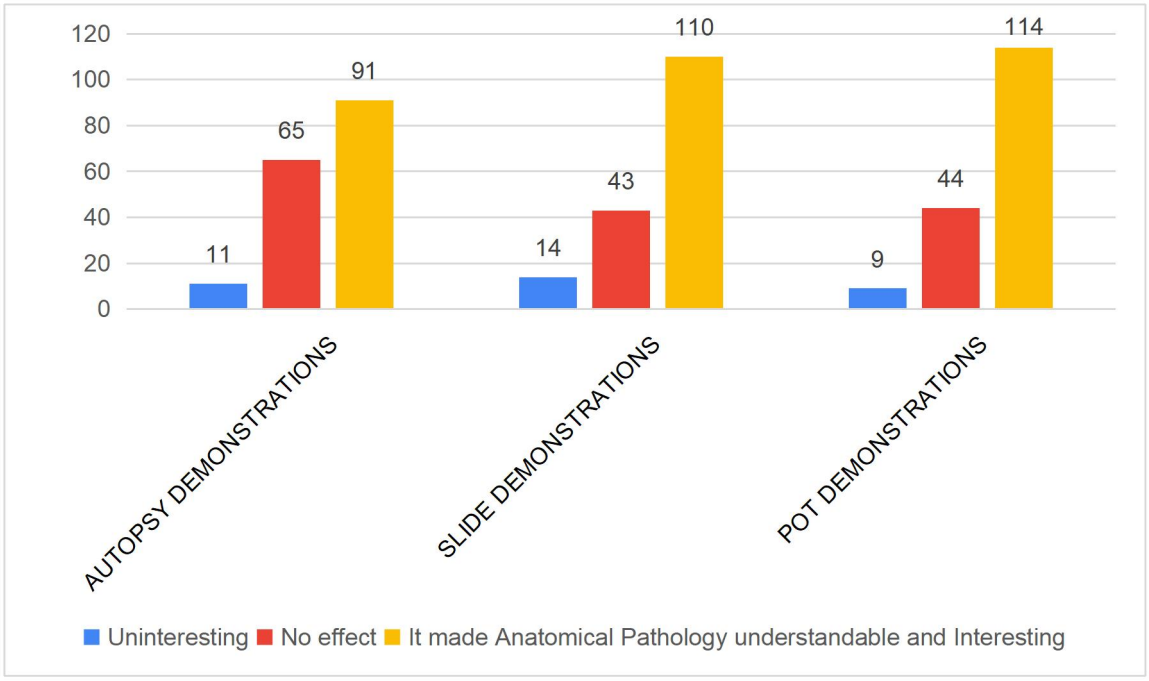

Figure 5: The perception of students about the various anatomical pathology practical demonstrations

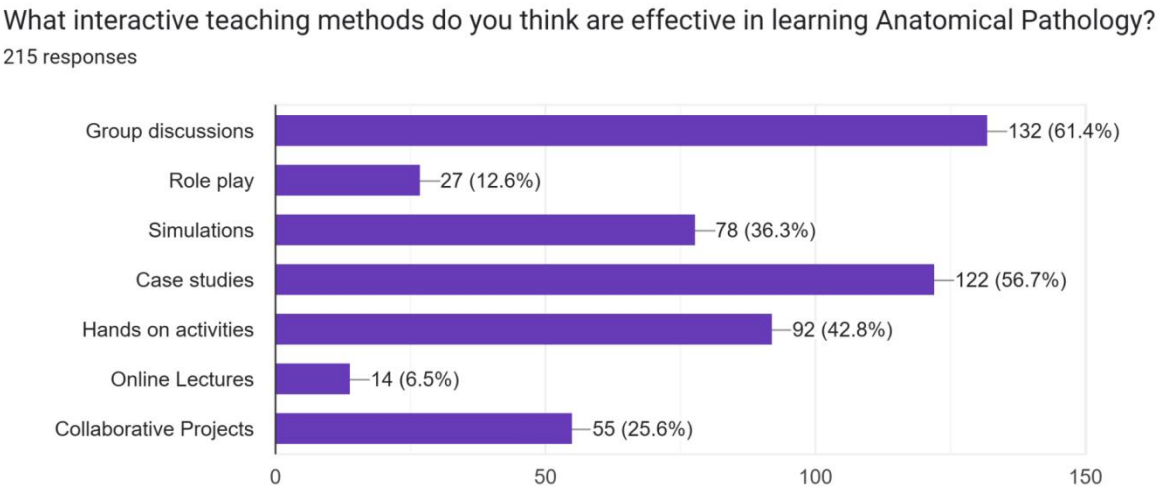

Figure 6: Interactive teaching methods and the most effective of them

Table 3: Summary of students' course status, exam attempts, and score distribution in anatomical pathology

Lead Question	Responses	No. of participants (%)	Percentage
Have you passed the Anatomical Pathology exam?	Still in the class	44	20.5%
	Yes	166	77.2%
	No	5	2.3%
	Total	215	100%
Exam Performance	Passed on first attempt	150	90.4%
	Passed after first resit	14	8.4%
	Passed after second resit	2	1.2%
	Total	166	100%
Student score range (%)	50-59	64	
	60-69	65	
	70-79	16	
	80-89	4	
	90-100	1	

Inferential Analysis

Inferential statistics were applied to further explore relationships among key variables. Chi-square analysis revealed a significant association between higher attendance and preference for interactive learning methods such as group discussions and case studies ($\chi^2 = 11.82$, $p < 0.05$). A moderate positive correlation was also observed between attendance and academic performance ($r = 0.34$, $p < 0.01$), indicating that students who attended classes more regularly tended to achieve higher scores. Likewise, preference for interactive teaching methods was weakly but positively associated with performance outcomes ($r = 0.22$, $p < 0.05$).

The last continuous assessment test score range of the 44 students who are still in the Anatomical Pathology class is shown sin figure 7.

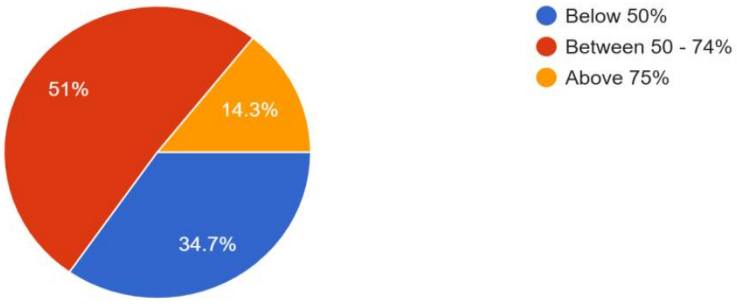

Figure 7: Recent continuous assessment results of current anatomical pathology students

DISCUSSION

This study shows that students exhibit a strong preference for attending lectures and practical sessions over seminar, suggesting that the students found seminar less engaging. Seminar involves giving students a topic to prepare and present via PowerPoint in front of fellow students and their lecturers. Thereafter questions to the presenters and discussion follow. Other studies, however showed that students perceived the seminar to be useful to their understanding of their courses.[21,22] This pattern may indicate that while seminars encourage independent learning, factors such as time pressure and presentation anxiety limit engagement. This finding suggests a need to redesign seminar activities to include more collaborative preparation or formative feedback sessions. These findings underscore the need for curriculum reform that balances didactic lectures with more participatory formats. Faculty development programs should emphasize student-centered teaching strategies, communication training, and the integration of technology to enhance engagement.

Majority of the students met the 75% required attendance at lectures, practicals and seminar although lectures had the highest attendance. This finding is consistent with previous research, which has shown that lectures are often the most popular format for learning among students.[23] Wolff et al. [24] in their study stated that medical education frequently employs lectures as a primary teaching method. Also, majority of the students passed their exams at the first sitting which is consistent with existing literature that suggests that students tend to prioritize learning activities that they perceive as relevant and useful for their academic and professional development and thus attendance rates may have an impact on performance.[25] The high attendance rates in lectures and practicals may be attributed to the fact that these formats provide students with opportunities to engage with complex materials in a more structured and interactive way.[26] Picton and Baik,[27] however, showed that interactive and engaging learning experiences, as seen in seminars, are very crucial in higher education learning.

Majority of student reported that the quality of lecture delivery was above average, however majority of the students insisted that the lectures did not increase their interest in Anatomical Pathology. Existing evidence shows that the quality of lectures can significantly influence student attitudes towards the subject as seen by Entwistle and Tait[14] who highlighted the importance of lecturer's enthusiasm and expertise in promoting student motivation. In this study however, the quality was deemed high but most students attended primarily due to compulsory attendance policy. It seems that the compulsory nature of attendance as a prerequisite to qualify to write exam is what made them to come to class. This supports the theory that students' attendance to lectures must be enforced by the university administration.

Inferential analyses using SPSS explored associations among attendance, preferred teaching methods, and academic performance. Results indicated that students with higher attendance were more likely to prefer interactive learning methods such as group discussions and case-based learning, supporting findings that collaborative learning enhances engagement and understanding.[28,.29] Attendance was also positively linked to academic performance, consistent with evidence that regular participation predicts better examination outcomes.[30,31] Additionally, students who favored interactive learning achieved slightly higher scores, aligning with global studies showing that active learning strategies improve academic results.[32,33] The students said that all the practical demonstration methods (pot demonstration, autopsy demonstration and slide demonstration) made the understanding of Anatomical Pathology easier. However, majority stated that Pot demonstration was the most impactful of the three practical demonstration methods. Numerous studies emphasize the importance of interactive and immersive learning experiences in medical education[26] highlighting the value of hands-on learning[22] and virtual augmented reality in medical education. [34,35]

In contrast, less number of students stated that autopsy demonstrations were less impactful in their understanding of Anatomical Pathology. This finding may be due to the nature of autopsy demonstrations, which can be

emotionally challenging and may not provide the same level of interaction as pot demonstrations. The availability of bodies for autopsy demonstration makes students to overcrowd when rare opportunities provide. This makes it less useful to students. Panusch et al[36] highlight the importance of careful planning and execution of autopsy demonstrations to maximize their educational benefits.

The interactive teaching methods (group discussions, role-play, simulations, case studies, hands-on activities, online lectures, and collaborative projects) in pathology were explored, including how they were used to engage students. Students stated that group discussions as the best student driven method to understand Anatomical Pathology. In group discussions, students gather in little groups as friends or following religious affiliations to discuss topics in Anatomical Pathology. Group discussions, in particular, have been shown to promote critical thinking, problem-solving, and communication skills among students. [26,35] By engaging in group discussions, students can share perspectives, develop mnemonics, and develop a deeper understanding of complex concepts from different perspectives.

Most students indicated that case studies teaching method is useful. Case studies are widely recognized as an effective approach in medical education. They provide students with real-world scenarios that require critical thinking, analysis, and problem-solving skills. [36] Many students in this study opined that online lectures were not effective. Online teaching is beguiled by internet connection issues and many other subtle distractions that wrestle for the students' attention. This finding is consistent with recent literature that highlights the limitations of online lectures in promoting student engagement and motivation[37]. While online lectures can provide flexibility and convenience, they may lack the interactive and immersive elements that are essential for effective learning.

The distribution of grades among students who passed in one sitting showed that majority of students scored between 60-69%, indicating a good understating of the course. This is consistent with recent literature that emphasizes the importance of effective teaching methods and learning strategies in promoting student achievement. [14,25] The fact that 14 students passed after the first resit and 1 student passed after the second resit examinations suggests that some students may require additional support or opportunities to help their understanding of the course material.

CONCLUSION

This study provides valuable insights into the attendance patterns and perceptions of students in Anatomical Pathology. The data reveal that students exhibit a strong preference for attending lectures and practical sessions over seminars. The high attendance rates in lectures and practicals may be attributed to the fact that these formats provide students with better opportunities to understand complex topics in more structured and interactive ways.

The findings align with the study goal of understanding student learning preferences and attendance behavior in Anatomical Pathology. By linking attendance, preferences, and performance, this research highlights that engagement-driven teaching fosters better academic outcomes.

Educators and policymakers should prioritize redesigning lecture delivery to be more interactive, incorporating small-group autopsy sessions, and encouraging collaborative seminar preparation. These reforms could enhance student motivation and long-term retention in Anatomical Pathology.

The study also highlights the importance of interactive teaching methods, such as group discussions and case studies, in promoting student engagement and motivation. In contrast, online lectures were perceived as less effective, suggesting that educators should prioritize the development of more interactive and immersive learning experiences.

The implications of this study are significant for teaching and learning in anatomical pathology. Educators should prioritize the development of high-quality and engaging lectures that cater to diverse student needs and provide opportunities for interactive learning. Additionally, educators should consider incorporating more interactive and immersive learning experiences, such as pot demonstrations, to promote student engagement and motivation. Autopsy demonstrations should be more frequent with

little clusters of students for better interactive learning.

Limitations of this study

This study is a cross-sectional study, and thus it limits the ability to assess changes in perception over time. In addition, a possibility of recall bias or social desirability bias amongst students filling the questionnaire may be considered. Beyond recall bias, self-reporting bias may have influenced the accuracy of responses, as students might have overstated attendance or engagement levels. Additionally, variations in teaching quality and institutional facilities across universities could act as confounding variables. Future studies could mitigate these limitations by incorporating qualitative interviews, longitudinal designs, and multi-institutional comparisons Furthermore, this study was conducted over 4 universities, so a limitation exists in extrapolating results to other universities in the Southern Nigeria. Finally, this being a quantitative study, there are limitations to depth of exploration in students' perception.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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Graduating List

Graduating Dental Surgeons for July 2025

OKEMINI, Nwobueze Okemini

ADIELE, Goodness Chiwetara

ALIMEZIA, Alison Daniel

BARIDAM, Yirabari Faith

BRAIMOH, Miracle Akhalu

BROWN, Success Ernest

DOGHOR, Oghenevwerorhe Precious

DON-OKAH, Divine Favour

GODDY-OTI, Blossom Owanate

IKE, Chioma Precious

IRINGE-KOKO, Tamunodein Comeforth

MINI, Priscillia Chinonso

OGEDI-JACOB, Jane

OGHENEBOR, Michael Oghenevwefe

AMAEWHULE, Divine Chimmakwa

EMENIKE, Sarah Emem

Graduating Medical Doctors for September 2025

AMADI-IKECHUKWU, Angela Blessing

ANIFOWOSE, Oluwasegun Olubunmi

ASINYE-IGONI, Tamunoipirinye Angel

DENEBARI, Daniel Lekue

IFOEGBU, Charles Chinedu

IGWE, Nancy Uchechi

ISAH, David Ojimaojo

KOTAI, Soen Daniel

NGBE, Hope Sankey

NTE, Godsfavour Awajiogak

OFEM, Aneozeng Ubi

OKENYA, Godson Chigoziri

ORAKWE, Chukwuebuka Prince

OSAROLUKA, Anasemi

OVWIGHO, Blessed Oghenerukevwe

SATURDAY, Umorami Oyeabuan

VINCENT-OBIALO, Chiamaka Leesi

WOBILOR, Joshua Godfrey

Erratum

In the Volume 19 Issue 2 of the Port Harcourt Medical Journal an error was noticed. The Graduating List for June 2025 appeared as “Graduating Dental Surgeons for June 2025”.

It is however being corrected to “Graduating Medical Doctors for June 2025”.

Graduating Medical Doctors for June 2025

ACHARA, David Chigozie
ADAMS, Queen Hephzibah
ADEYANJU, Kehinde Ebenezer
AFUASHI, Blessing Belema
AGBATE, Akpevweoghene Eunice
AGBUGUI, Amanosi Felicia
AKHIBI, Andrew
ALAGALA, Jeff Tordum
ALFRED-ORUPABO, Tamunofiri Betty
ALIKOR, Ohochuku Ejieme
ALLISON, Ibiene Fredricka
AMAECHI, Chukwuebuka Precious
AMAH, Kevin Okwudili
AMIESIMAKA, Sonime Blessing
ANTHONY, Rita Dornubari
ASALU, Lois Ibitayo
ASELEMI, Phoebe Bridget
AWOPEJU, Toluwani Ebunoluwa
BERTRAM, Metong Junior
BOLARINWA, Tolulope Philip
CHARLES, Stephen
CHINDAH, Montana
CHRISTIAN, Daniel
CHRISTIAN, Kenneth
CHUKWUEMEKA, Victor Chukwuebuka
CHUKWUMA, Soludo Esther
DAVID, Henry Ejiro
DEEKAE, Leeleebari Rachael
DICK, Happiness Chinaza
EBIMOGHAN, Oyinkepreye Edith
EJENAKEVWE, Oghenebrukohwo
EKEE, Omaoghene Anthonia
ELAKPA, Joseph Ehi
FADERO, Maxwell Jude
FRANCIS, Bari-ee Favour
FRIDAY, Jude Ewonubari
GBULE, Chizi Mariam
IBE, Stella Chinaza
IKECHUKWU, Emmanuel
IKEDIASOR, Vera Ugochinyere
IKENWA, Raymond Alexander
IKEOKWU, Chukwudi Stanley
IKONWA, Mgbeoma Ompadec
IKPOKU, Jones
ITINAGBEDIA, Karen Efe
ITORHO, Abigail Obehi
IYOYO, Precious Dienma
JORBE, Ruth Ntobari
KALIO, Tamunosiki Kerren
KALU, Chinaza Peter
KAREEM, Esther Ufuoma
KOGBARA, Burabari David
KOROYE, Richard Oyinua
MARK, Oseiose

MAZI, Chukwuemeka Johnpaul
MIENBI, Douye Felix
MORAKINYO, ELijah Okikiola
MORGAN, Asuoodini Okpabi
NDEGO, Chioma Ogechuku
NJOKU, Oluchi Glory
NNAKENYI, Makuochukwu Judith
NNAMDI, Ezigbo Ijeoma
NTEKIM, Gabriel Okon
NWACHUKWU, Adaugo Isabella
NWAEREMA, Chamberlain
NWIGWE, Anita
NWIKO, Saviour Friday
NWIWUGA, Mem Iyingi
NWULU, Stella Ogechinyereamaka
OBADIGIE, Marvellous Eghosa
OBASI, Ann Chinyere
OBASI, Kristin Chinyere
OBAZE, Ijeoma Valerie
OBIDIGBO, Chisom Friday
ODIA, Victor Ekenedilichukwu
ODORIKPE, Medlyn Nneoma
OGBOPINA, Esther Ayibanimi
OGEDI-JACOB, Nne
OFOEGBU, Godspower Uchenna
OJIE, Glory Ebube
OKAFOR, Stanley Chukwudi
OKEY-NWALA, Jedidiah
OKOLIE, Olivia Chima
OKUMGBA, Tamunoibuomie Favour
ONOGWU, Bartholomew Eneche
ONYEASO, Ugochi Omolaraeni
ONYEUKWU, Pauline Amarachi
ORUMIE, Cecilia Adikisimaka
OSUAGWU, Onyemanze David
OTI, Frank
OTU-EGWU, Emmanuella Chidera
OYAGBARA, Oghenetega Julius
OZURUMBA, Frances Chinecherem
PAA, Charles Kornee
PETER, Victor Oyale
PETER-THOMAS, Peace Oiza
PHILIP, Celestine Chimadhu
SALAMI, Oluwakemi Diepreye
SAMPSON, Truth Chineze
TAMUNODUKOBIPI, Stephen
TEEH, Favour Geoffrey
UDEZE, Victor Kosisochukwu
UZIE, Favour Amarachi
UZOKA, MaryCindy Chinelo
WOSU, Ruth Aiyikelachi
YOUDUBA, Walter

Appreciation

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