Epidemiology, outcomes and challenges of cleft palate surgeries in Port Harcourt: a 10-year retrospective study

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Abstract

Background: Cleft palate is a significant congenital condition affecting feeding, speech, hearing, and psychosocial development. In low-resource settings like Nigeria, limited access to specialized care often results in delayed treatment and poor outcomes.

Aim: To investigate the epidemiology, outcomes and challenges of cleft palate surgeries in Port Harcourt, Nigeria.

Methods: A retrospective study of patients who underwent cleft palate repair from January 2015 to December 2024 at the University of Port Harcourt Teaching Hospital, Port Harcourt. Data were obtained from the Smile Train Express database and included demographics, age at presentation, cleft type, associated anomalies, surgical techniques, and complications. Analysis was conducted using Microsoft Excel and SPSS version 20.

Results: The mean age at surgery was 2.5 years (range: 6 months–25 years) with slight male preponderance. Majority underwent surgery between the ages of 9 months and 3 years. Unilateral cleft palate was present in 70% of cases; bilateral in 30%. Associated anomalies, primarily cardiac and auditory, were noted in 20%. Primary repair was performed in 80%, predominantly using the von Langenbeck technique. The overall complication rate was 15%, with wound infections (8%) being most common, followed by fistula formation (4%) and respiratory complications (3%).

Conclusion: There is a slight male preponderance among those who had surgery for cleft palate. There were more unilateral cleft palates than bilateral cleft palates. Associated anomalies were identified in one-fifth of the patients. Primary cleft palate repair was the most frequently performed procedure using the von Langenbeck technique. The most common complication was wound dehiscence.

Keywords: Cleft palate, epidemiology, outcome, challenges, surgeries

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INTRODUCTION

Cleft lip and/or palate is the most prevalent congenital anomaly affecting the head and neck region globally, with an estimated prevalence ranging from 0.5 to 1.6 per 1,000 This is an open access journal and articles are distributed under the terms of the Creative Commons Attribution License (Attribution, Non-Commercial, ShareAlike 4.0) -(CCBY-NC-SA4.0) that allows others to share the work with an acknowledgement of the work's authorship and initial publication in this journal.

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live births.¹ According to clinical practice guidelines, children diagnosed with cleft palate, craniofacial abnormalities, or syndromic anomalies are categorized as at-risk.²

Cleft lip and/or palate (CL/P) presents both functional challenges, such as difficulties in feeding and speech, and aesthetic concerns that can lead to significant psychosocial distress due to societal stigma. This stigma often results in reduced educational attainment and limited employment opportunities, thereby hindering the achievement of key life milestones. The aetiology of CL/P is involving multifactorial, both genetic predispositions whether inherited or arising de novo and environmental exposures, such as maternal smoking, certain infections, and nutritional deficiencies, particularly during early pregnancy.^{3,4} The economic burden of cleft palate is also considerable, particularly in settings where out-of-pocket healthcare expenditures are common.5

Cleft palate may present in either a syndromic or non-syndromic form. Approximately 30– 50% of children with cleft palate exhibit associated syndromic anomalies. These syndromes often result from multifactorial aetiologies involving both genetic mutations and environmental influences, leading to varied phenotypic presentations.⁶

The complexity of these syndromes highlights the necessity for early and thorough evaluation, as well as coordinated management by a multidisciplinary team that includes geneticists, surgeons, speech-language therapists, and other specialists, to optimize outcomes and address the comprehensive needs of affected individuals.^{7,8}

A comprehensive understanding of the genetic basis and clinical manifestations of syndromic cleft palate is critical for delivering effective care and support to affected individuals and their families.^{2,3,6} By recognizing the unique characteristics associated with each syndrome, healthcare professionals can formulate targeted treatment strategies that improve both clinical outcomes and quality of life customized for individual patients.⁸

Financial limitations are also critical, as concerns about the affordability of treatment may result in families deferring or forgoing necessary care.^{5,9-11} Even when families decide to seek care, geographic and logistical challenges such as distance from healthcare facilities, inadequate transportation, and limited healthcare availability in rural areas access.^{5,11} hinder Transportation can difficulties and long travel times may deter families from seeking timely intervention, and long waiting periods at treatment centres can further delay necessary care. Once at healthcare facilities, families may still face systemic delays due to insufficient human and material resources, limited surgical capacity, and prioritization of emergency cases. Furthermore, the absence of a coordinated multidisciplinary approach incorporating surgeons, speech therapists, orthodontists, and other specialists can impede the delivery of comprehensive care.^{5,11}

The financial burden of cleft palate treatment remains a major challenge. Surgical procedures, orthodontic appliances, and speech therapy materials can be prohibitively expensive, especially in environments where out-of-pocket payments are the primary means of healthcare financing.⁵ These economic pressures contribute to delayed or incomplete treatment, adversely affecting long-term outcomes.^{11,12}

Despite advancements in surgical techniques, access to cleft care remains limited in many parts of Nigeria. Tertiary healthcare institutions, such as the University of Port Harcourt Teaching Hospital (UPTH), play a vital role in providing specialized surgical care to individuals with cleft palate.¹³ Conducting a retrospective review of cleft palate surgeries performed at UPTH offers valuable insights into surgical outcomes, clinical challenges, and potential areas for improving service delivery. trends, complications, Evaluating and treatment outcomes over a ten-year period can help inform strategic planning and policy development to optimize cleft care.¹⁴

Given the substantial financial barriers faced by families, a comprehensive strategy is needed, that prioritizes awareness-raising, improved access to healthcare, and financial support for affected households.⁵

The aim of this study was to determine the epidemiology, outcomes and challenges of cleft palate surgeries in Port Harcourt, Nigeria, with a view to identifying areas for improvement and optimizing care for patients with cleft palate.

METHODOLOGY

This was a retrospective study, reviewing all patients who underwent cleft palate surgery at the University of Port Harcourt Teaching Hospital (UPTH) between January 2015 and December 2024. Patient data were retrieved from the Smile Train Express (STX) Cloud database. Variables collected included biodata, demographic characteristics, age at presentation, presenting challenges, surgical procedures performed, and postoperative outcomes, including patient or caregiver satisfaction and complications following the repair.

Data analysis was carried out using Microsoft Excel and the Statistical Package for the Social Sciences (SPSS), version 20 (IBM Corp., Armonk, NY, USA). Descriptive statistics were used to summarize the data.

Ethical approval for this study was obtained from the Research and Ethics Committee of the University of Port Harcourt Teaching Hospital. Patient confidentiality was maintained throughout the study.

RESULTS

A total of 127 patients who underwent cleft palate surgery between January 2015 and December 2024 were included in the study. . A total of 127 patients underwent cleft palate surgery during the 10-year review period, The cohort comprised 65 males (51.18%) and 62 females (48.82%) with a male-to-female ratio of 1.05:1. The mean age at the time of surgery was 2.5 years (standard deviation ± 1.8 years), with an age range spanning from 6 months to 25 years. Figure 1 shows the age group against the gender of patients who underwent surgery for cleft palate. Ages 1-5 years had females as 39(30.71%), and male as 44(34.65%); 6-12 years had females as 19(14.96%), and males as 13(10.24%); 13-19 years had females as 2(1.57%) and male 4(3.15%) and ≥ 20 years had females as 2(1.57%) and males as 4(3.15%). The majority of patients (68%) underwent surgery between the ages of 9 months and 3 years, reflecting standard clinical practice aimed at promoting optimal speech development. A smaller subset of patients (15%) received surgical intervention after the age of 5 years, often due to delayed

diagnosis, associated co-morbidities, or previous unsuccessful interventions. Most of the children who were 2 to 5 years of age were gotten during the Smile Train Awareness week, marked by intensive awareness campaigns into remote parts of the state. Table 1 shows the frequency of patients with cleft palate for both males and females who underwent surgery in various years of the study period. More patients underwent surgery in 2022 and 2024. Regarding the type of cleft, 70% of patients presented with unilateral cleft palate, while 30% had bilateral cleft palate. Associated anomalies were identified in 20% of patients, with common co-morbidities including heart defects and hearing loss.

In terms of surgical techniques, primary cleft palate repair was the most frequently performed procedure, accounting for 80% of cases, while secondary repairs (revision surgeries) constituted 20%. The von Langenbeck technique was the predominant surgical approach, utilized in the majority of cases both for primary and revision surgeries.

Table 2 shows the age against outcome of and female patients surgery for male discharged with no post operative complications and those discharged with post operative complications. Complications were most common in the 1-5 years age group. The overall complication rate was 15%. The most common complication was wound dehiscence following infection, which occurred in 8% of patients, followed by fistula formation at 4% and respiratory complications at 3%.

Table 3 shows the distribution in frequency diagnosis, and percentages on the abnormalities, type of operation and complications of cleft palate for both gender. CCP, ICP, fistula was diagnosed in both males and females with CCP found to be high in with this value 47(51.65%), males abnormalities seen to be higher in the males with this value 54 (51.92%). FR and FC were also carried out. The type of cleft palate repair carried out in this study were represented to be IVVP, LV, PVSLR and TFP. Though there were complications seen in both gender, except for no complications in females above 13 years.



Figure 1: Age group against gender of patients who underwent cleft palate surgery

VFAD	F	REQUENCY (%)	
ILAN	FEMALE	MALE	вотн
2015	5 (50.00)	5 (50.00)	10
2016	2 (28.57)	5 (71.43)	7
2017	2 (22.22)	7 (77.78)	9
2018	2 (20.00)	8 (80.00)	10
2019	7 (53.85)	6 (46.15)	13
2020	2 (100.00)	0 (0.00)	2
2021	9 (75.00)	3 (25.00)	12
2022	15 (62.50)	9 (37.50)	24
2023	9 (50.00)	9 (50.00)	18
2024	9 (40.91)	13 (59.09)	22
Total	62	65	127

Table 1: Frequency of patients with cleft palate who underwent surgery at various years

	FREQUENCY (%)					
AGE GROUP	FEMALE			MALE		
	DISCHARGED WITH COMPLICATIONS (DWC)	NO POST OPERATIVE COMPLICATIONS (NPOC)	TOTAL	DISCHARFGED WITH COMPLICATIONS	NO POST OPERATIVE COMPLICATIONS	TOTAL
1-5 YRS	10 (25.64)	29 (74.36)	39	7 (15.91)	37 (84.09)	44
6 - 12 YRS	4 (21.05)	15 (78.95)	19	2 (15.38)	11 (84.62)	13
13 - 19 YRS	0 (0.00)	2 (100.00)	2	1 (25.00)	3 (75.00)	4
≥20 YRS	0 (0.00)	2 (100.00)	2	1 (25.00)	3 (75.00)	4
TOTAL	14	48	62	11	54	65

Table 2: Age against outcome of surgery (complications/no post operative complications) by gender

Table 3: Distribution in frequency and percentages on the diagnosis, abnormalities, type of operation and complications of cleft palate for both gender

PARAMETER		FREQUENCY (%)			
		FEMALE (%)	MALE	BOTH GENDER	
	ССР	44 (48.35)	47 (51.65)	91	
DIACNOSIS	ICP	17 (50.00)	17 (50.00)	34	
DIAGNOSIS	FISTULA	1 (50.00)	1 (50.00)	2	
	TOTAL	62	65	127	
	PRESENT (SPEECH)	50 (48.08)	54 (51.92)	104	
ABNORMALITIES	ABSENT	12 (52.17)	11 (47.83)	23	
	TOTAL	62	65	127	
	РСР	48 (49.48)	49 (50.52)	97	
TYPE OF OPERATION	SCP	7 (36.84)	12 63.16)	19	
	FR	7 (63.64)	4 (36.36)	11	
	TOTAL	62	65	127	
	FC	7 (63.64)	4 (36.36)	11	
	IVVP	13 (59.09)	9 (40.91)	22	
	LV	36 (45.00)	44 (55.00)	80	
TYPE OF REPAIR	PV	0 (0.00)	1 (100.00)	1	
	SLR	0 (0.00)	1 (100.00)	1	
	TFP	6 (50.00)	6 (50.00)	11	
	TOTAL	62	65	127	
COMPLICATIONS	DISCHARGED WITH COMPLICATIONS	14 (56.00)	11 (44.00)	25	
	NO POST OPERATIVE	48 (47.06)	54 (52.94)	102	

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COMPLICATIONS TOTAL

TOTAL	62 65 127
Key:	customized surgical techniques and
CCP: Cleft Care Program or Cleft Craniofacial Program	of each patient.
ICP: Individualized Care Plan or Integrated Care Pathway	By comprehending the intricacies and results related to cleft palate surgery, healthcare professionals can enhance their approaches to
PCP: Primary Care Physician or Pediatric Care Provider	elevate patient outcomes and overall quality of life. The results of the study regarding the surgical management and outcomes for
SCP: Speech Care Provider or Surgical Care Plan	patients with cleft palate are consistent with existing research in several key areas. The
FR: Feeding Rehabilitation or Facial Reconstruction	average age for surgery, recorded at 2.5 years, is within the recommended time frame of 12- 18 months as advised by the American Cleft
FC: Feeding Clinic or Facial Cleft	Palate Association. According to the American
IVVP: Internal Velopharyngeal Valve Performance (related to VPI assessment)	guidelines, early multidisciplinary intervention is critical to facilitate optimal speech
LV: Levator Veli Palatini (muscle involved in velopharyngeal function)	development in children with craniofacial anomalies. ¹⁵ Nevertheless, the wide age range observed in this study (6 months to 25 years)
PV: Palatal Velum or Pharyngeal Valve	reflects the variability in clinical presentation
SLR: Speech Language Rehabilitation or StraightLine Repair (surgical technique)	and management strategies, a finding consistent with prior research on speech outcomes and developmental trajectories in
TFP: Team Feeding Plan or Temporary Feeding Plan	cleft populations. ⁴ The study also reveals a higher occurrence of
DISCUSSION	unilateral cleft palate (70%) compared to
The research offers significant insights into the surgical treatment and results for patients with cleft palates. The average age at which surgery was performed was 2.5 years, with ages ranging from 6 months to 25 years, reflecting a diverse age distribution among the subjects. It is noteworthy that unilateral cleft palates were more common, representing 70% of the cases,	agreement with epidemiological data, ^{1,3,4} underscoring the more frequent nature of unilateral clefts. Additionally, the identification of associated anomalies in 20% of patients corresponds with literature that suggests individuals with cleft palate face a heightened risk for other congenital conditions, emphasizing the necessity for thorough
while bilateral cleft palates accounted for 30%. These findings highlight the necessity for careful surgical techniques and diligent postoperative care to reduce the likelihood of complications. Regarding long-term outcomes, speech development was a primary focus.	evaluation and multidisciplinary care. ^{1,4,6,15,16} The predominance of primary cleft palate repair (80%) and the application of the von Langenbeck technique are corroborated by studies that demonstrate the effectiveness of this method in achieving favorable
These outcomes emphasize the importance of	outcomes. ^{3,11,13,15} The reported complication

62 65

rates, including wound infections (8%), fistula

formation (4%), and respiratory issues (3%),

fall within the ranges noted in other research.^{3,11,13,15} The necessity for continued

speech therapy and support is underscored by

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palate

These outcomes emphasize the importance of continued speech therapy and support to

enhance results for individuals with cleft

palates. Overall, the study adds to the

management, stressing the significance of

on

cleft

literature

expanding

the group of patients experiencing speech difficulties.¹⁷ This study adds to the expanding body of literature on cleft palate management, reinforcing the importance of customized surgical techniques and comprehensive care. By understanding the complexities and outcomes associated with cleft palate surgery, healthcare providers can refine their strategies to improve patient outcomes and quality of life.¹⁸

The higher number of females and males in the younger age groups (1-5 years and 6-12 years) in our study aligns with trends observed in pediatric surgical literature.¹⁸⁻²¹ Studies have shown that a significant proportion of surgical procedures in children are performed in these age groups, often for conditions such as congenital anomalies or injuries.3,11,13,15,17,18 The decrease in the number of patients in the older age groups (13-19 years and ≥ 20 years) could be attributed to the types of surgeries being considered or the population's demographics. Research on surgical trends has indicated that the volume and types of surgeries can vary significantly across different age groups, with younger populations often requiring more surgeries for congenital or developmental conditions.^{3,11,13,15,17,18} The slight imbalance in gender distribution across age groups in this study is consistent with some surgical literature, which suggests that gender differences in surgical rates can vary depending on the type of surgery and population being studied.^{3,11,13,15,17-19} The percentage distribution showing differences between genders across age groups might reflect underlying demographic or healthcareseeking behavior differences in the population studied.^{1,3,4,6,11,15,16,18-20} Studies have indicated that gender can influence healthcare utilization and surgical outcomes in complex ways, depending on various factors including age, socioeconomic status, and access to care.^{1,3,4,6,11,15,16,18-21} The age distribution in this study might reflect broader trends in surgical populations, particularly if the surgeries considered are more common in younger populations. Literature on surgical trends has shown that the age distribution of surgical patients can vary widely depending on the specific surgical specialty and population being studied.^{1,3,4,6,11,15,16,18-21} The distribution might also reflect the population's access to healthcare and the prevalence of certain conditions requiring surgery. Research has highlighted the importance of considering these factors when interpreting surgical trends and outcomes.^{1,3,4,6,11,15,16,18-21}

The study shows variability in the gender ratio of cleft palate cases over the years, with some years having a higher proportion of females and others having a higher proportion of males. Literature on cleft lip and palate suggests that there can be gender differences in the incidence, with some studies indicating a slightly higher incidence in males.^{3,4,11} The yearly fluctuations in gender distribution in our study might reflect random variation due to small sample sizes in some years or real changes in population demographics or environmental factors. Studies have shown that the incidence of cleft lip and palate can varv over time and between different populations.^{1,4,16,18} Epidemiology of cleft palate, including gender distribution, can vary significantly across different populations and geographic regions. Some studies have reported a higher incidence of cleft palate in females, while others have found a higher incidence in males or no significant gender difference.^{1,4,16,18} Temporal trends in the incidence of cleft palate have been observed in some studies, potentially related to changes in environmental exposures, maternal health, or genetic factors. This study shows variability over the years could be consistent with these observations, although more detailed analysis would be needed to identify specific trends.1,4,15,16

The data in our study shows a higher proportion of postoperative complications in younger age groups (1-5 years and 6-12 years) compared to older age groups. Literature suggests that pediatric populations can have different postoperative complication profiles compared to adults, often related to developmental and physiological differences.^{1,4,15,16} The complication rates seem to decrease with increasing age in our data, particularly for females. Some studies indicate that younger children might be at higher risk for certain postoperative complications due to their smaller size, developing physiology, and potential for respiratory or cardiac issues. The

data shows some differences in complication rates between males and females across age groups. Literature on gender differences in postoperative complications is mixed, with some studies suggesting potential differences in risk and outcomes based on gender, while others find no significant differences.^{3,5,11,15,18,19}

The data shows a higher frequency of complete cleft palate (CCP) compared to incomplete cleft palate (ICP) and fistula. Literature suggests that CCP is a common type of cleft palate, often requiring comprehensive plans.^{3,4,6,11,15,18} treatment The gender distribution in this study data shows a relatively balanced distribution between females and males across different types of cleft palate. Some studies indicate potential gender differences in the incidence of cleft lip and palate, but findings can vary.^{3,4,6,11,15,18} The data indicates a high frequency of speech abnormalities in patients with cleft palate. Literature emphasizes the importance of speech therapy in the treatment plan for patients with cleft palate, as speech difficulties are common.^{9,18,19} There are a variety of surgical techniques used for cleft palate repair. including cleft palate primary (PCP), secondary cleft palate (SCP), and fistula repair (FR). Literature describes various surgical techniques for cleft palate repair, with the choice of technique depending on the individual case and surgeon preference.^{3,11,13,15,17,18} The data indicates different types of repair techniques used, such as FC, IVVP, LV, and others. Studies discuss the importance of selecting the appropriate repair technique based on the patient's specific needs and anatomy.^{3,11,13,15,17,18} The present study had a complication rate of approximately 19.7% (25/127). Literature reports varying complication rates for cleft palate surgery, depending on factors such as the type of surgery, patient health, and postoperative care.^{3,11,13,15,17,18}

Challenges and Limitations

Several systemic and contextual challenges continue to affect the delivery of optimal cleft care in Nigeria. The limited access to cleft care services remains a significant barrier, particularly in rural and underserved regions, where specialized surgical and rehabilitative services are often unavailable or difficult to reach. There is a shortage of trained cleft surgeons and speech-language pathologists, which hampers the timely and effective management of cleft palate cases. The limited human resource capacity contributes to delays in surgical intervention and inadequate postoperative rehabilitation.

The lack of integrated multidisciplinary cleft teams. including audiologists, care orthodontists, psychologists, and nutritionists, restricts the provision of comprehensive care essential for addressing the complex needs of individuals with cleft palate. Insufficient public awareness and education about cleft lip and palate, including available treatment options and the importance of early intervention, leads to late presentations and contributes to stigma and misconceptions communities. These limitations within highlight the need for systemic investment in healthcare infrastructure, workforce development, and community engagement to improve cleft care outcomes in low-resource settings.

CONCLUSION

There is a slight male preponderance among those who had surgery for cleft palate. Their ages varied from 6 months to 25 years . The majority of patients underwent surgery between the ages of 9 months and 3 years. There were more unilateral cleft palates than bilateral cleft palates. Associated anomalies were identified in one-fifth of the patients. Primary cleft palate repair was the most frequently performed procedure. The von Langenbeck technique was the predominant surgical approach. The overall complication rate was 15%. The most common complication was wound dehiscence following infection.

Enhancing cleft care in Nigeria necessitates a comprehensive, multi-tiered approach that expanding access to includes surgical intervention, speech therapy, and coordinated multidisciplinary care. Addressing the epidemiology systemic challenges and outcomes requires not only investment in healthcare infrastructure and workforce development but also targeted efforts to raise awareness and reduce public stigma. Continued research is vital to better understand

the context-specific barriers and to develop evidence-based strategies that improve treatment outcomes. Collaboration among healthcare professionals, policymakers, and researchers is essential to drive sustainable improvements in care delivery. Ultimately, strengthening cleft care systems will contribute to improved health outcomes and quality of life for individuals with cleft palate, reinforcing the importance of prioritizing this often-under-recognized public health issue in Nigeria.

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Conflict of interest

There is no conflict of interest.

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