Review

Adenoidectomy and Adenotonsillectomy in Osogbo, Nigeria, Indications, and Outcomes: A Retrospective Clinical Review

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ABSTRACT

Background: Adenoidectomies and tonsillectomies are among the most common paediatric procedures worldwide. We reviewed the clinical records of adenotonsillectomies performed at our center, with the aim of informing surgical best practices.

Methods: This retrospective cross-sectional study was conducted at UNIOSUN Teaching Hospital, Osogbo, Nigeria. The study reviewed five-year records of patients from January 2018 to December 2022. Descriptive analyses were used to summarise results.

Results: A total of 428 folders of children aged 1 – 15 years (mean age 5.7 ± 3.2 years) were retrieved, male to female ratio 3:2. The mean duration of symptoms was 6.8 ± 2.3 months. Indications were adenotonsillectomy 364 (85.1%), tonsillectomy 41 (9.6%), and adenoidectomy 23 (5.4%). Patients presented with more than one symptom, including recurrent nasal obstruction 428 (100%), mouth breathing 421 (98.4%), and snoring/noisy breathing 411 (96%). Recurrence occurred in 53 (12.4%), of whom 14 (3.3%) had repeat surgeries. Predisposing factors to recurrence were allergy 33 (62.3%), age < 1 year 7 (13.2%), scaring 4 (7.5%), and no identifiable factor 9 (17.0%). General anaesthesia and muscle relaxant were used in 296 (69.2%) cases. Adenotonsillectomy had the highest mean blood loss, 50 ± 2.5ml. The commonest analgesic was paracetamol alone in 45.1%. Postoperative complications were pain 45 (10.5%), PONV 76 (17.6%), and respiratory problems 6 (1.4%). No mortality was recorded.

Conclusion: In our center, adenotonsillectomies were effective, with low complications and satisfactory outcomes. Recurrence is linked to allergy and early age. Anaesthesia was safe, underscoring the ability of low-resource centers to deliver high-quality ORL procedures.

Keywords: adenoidectomies, adenotonsillectomies, anaesthesia, indication, outcome, Nigeria.

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INTRODUCTION

Globally, adenoidectomy and tonsillectomy are probably the most common otorhinolaryngological procedures, especially among children, with variations in clinical profile and outcomes across centers, countries, and regions.[1,2]

It serves as a cure for upper airway obstruction (AO), sleep-disordered breathing (SDB), recurrent adenoid and tonsillar infections, as well as feeding and speech abnormalities.[3]

Its burden is high worldwide. Erickson et al[2] in a 35-year review of 8106 patients, observed that the incidence of adenoidectomies and adenotonsillectomies is rising, and indications had shifted from upper respiratory tract infection (URTI) to AO. Lawal et al[4] reported that 1249 adenoidectomies were performed in a single tertiary center in Nigeria over 10 years. However, in spite of their global and regional distribution, their prevalence is largely underreported, in low-income countries (LIC). [4,5]

Adenotonsillectomies have absolute or relative indications. Absolute indications are adenoid and tonsillar hyperplasia, abnormal dentofacial growth, obstructive sleep apnea (OSA), overt or suspected malignancy, and bleeding tonsillitis. Relative indications are feeding and speech problems, halitosis, otitis media with effusion (OME), recurrent sinusitis, and tonsillar abscess.[6]

Worldwide, adenotonsillectomies are largely successful. However, socio-environmental factors often predispose to poor surgical outcomes in sub-Saharan Africa. These include low awareness, poor access to healthcare, late presentation, limited skills and resources, allergic predisposition, and poor follow-up.[7] Others are age below 3 years, OSA, craniofacial dysmorphism, syndromic disorders, inappropriate surgical technique, obesity or low body weight, positive family history, severe co-morbidities, and size of the palate.[8]

Postoperative complications include tonsillar bleeding, which could be massive, infection, postoperative pain, postoperative nausea and vomiting (PONV), respiratory problems, e.g., hypoventilation, apnea and hypoxia, fever, AO, and speech or swallowing difficulty.[9,10]

We noted that there are few studies on the demographic profile, surgical and anaesthetic practices of adenotonsillectomies in Nigeria. The data gap on predisposing factors, indications, and surgical outcomes hinders evidence-based clinical decision-making and contributes to inconsistent surgical practices. It also precludes the development of standard protocols tailored to local needs.

This study aims to fill this gap by exploring the indications, intraoperative care, and surgical outcome of adenotonsillectomies in a tertiary hospital in Osogbo, Nigeria. Thus, we aim to provide locally relevant data that may inform surgical best practices and reduce complications.

MATERIALS AND METHODS

Study design: This retrospective cross-sectional study was conducted at the Departments of Otorhinolaryngology (ORL) – Head and Neck, and Anaesthesia, UNIOSUN Teaching Hospital, Osogbo, Nigeria. The study reviewed the clinical records of patients who had adenoid, tonsillar, or combined surgeries over five years from January 2018 to December 2022. The hospital, with a functional Otorhinolaryngology – Head and Neck surgical unit and comprehensive anaesthesia department, is a referral center in Osun state and neighboring areas.

Study population: Case folders of children who had adenoidal and or tonsillar surgeries during the study period were retrieved.

Inclusion/exclusion criteria: Children aged 1 – 15 years, who had surgery under general anaesthesia (GA) at the hospital, and who had complete medical records, were included. Excluded from the study were emergency airway management, e.g., tracheostomy for airway compromise, malignancy, bleeding problems, syndromic children or congenital anomalies affecting the airway or immune function, and co-morbidities, e.g., sickle cell diseases, or bleeding disorders.

Data collection: Data were obtained from the ORL departmental records, theater register, anaesthesia records, surgical notes, and postoperative ward follow-up documentations. Data collected were demographics, e.g., age, sex, and weight, American Society of Anesthesiologists (ASA) physical status, indications for surgery, number of surgeries, recurrence rate, and preoperative care, predisposing factors, intraoperative parameters, e.g., blood loss, anaesthesia technique, analgesia, as well as postoperative profile.

Terms: American Society of Anesthesiologists (ASA) physical status, and investigation findings were determined at pre-anaesthesia review. Cormack & Lehane classification was obtained at laryngoscopy. Blood loss was determined intraoperatively using soaked gauze and amount in suction bottle. Analgesic was as prescribed over 24 – 48 hours after surgery. Respiratory problems were episodes of hypoventilation, or desaturation that needed oxygen supplementation for > 60 mins after surgery.

Data analysis: Data were compiled into MS Excel 2022, cleaned and analysed using SPSS version 25.0 (IBM). Descriptive statistics were used to analyse data. Continuous variables, e.g., age and weight expressed in means and standard deviation, were summarised using

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the student t-test and one-way ANOVA. Categorical variables, e.g., sex, tonsillar size expressed as frequencies and percentages, were summarised using Chi-square tests. Statistical significance threshold is set at $p < 0.05$. Research and Ethical Committee of UTH, Osogbo, gave ethical clearance for the study.

RESULT

Out of 512 retrieved folders, 428 (83.6%) had complete records. The mean age was 5.7 ± 3.2 years, and more males, 268 (62.6%), than females, 160 (37.4%), with a ratio of 3:2. The mean duration of symptoms was 6.8 ± 2.3 months. Cormack and Lehane airway grades I, II, and III were 73.8%, 16.1% and 10.1% respectively. ASA physical status was I (71.2%), II (25.9%), and III (2.9%). Adenotonsillectomy 364 (85.1%) was the main surgery. The mean duration of surgery was highest in adenotonsillectomy, 42 ± 5 minutes. Preoperative ECG findings were normal in 325 (75.9%) patients (Table 1).

Table 1. Demographic and surgical variables n - 428

Variable	Category	Freq - N (%)
Age (years)		1 – 15
Mean age ± SD (years)		5.7 ± 3.2
Sex	Male	268 (62.6)
	Female	160 (37.4)
ASA	I	308 (71.2)
	II	111 (25.9)
	III	9 (2.9)
Mean BMI (kg/m²)		24.22
Tonsillitis history (months)		6.8 ± 2.3
Tonsillar grade	III	248 (57.9)
	IV	180 (42.1)
Airway classification (Cormack-Lehane)	I	316 (73.8)
	II	69 (16.1)
	III	43 (10.1)
Duration of surgery (min)	Adenoidectomy	30 ± 6
	Tonsillectomy	35 ± 7
	Adenotonsillectomy	42 ± 5
Number	Adenoidectomy	23 (5.4)
	Tonsillectomy	41 (9.6)
	Adenotonsillectomy	364 (85.1)
Preop ECG Finding	Normal ECG	325 (75.9)
	Sinus tachycardia	87 (20.3)
	T-wave abnormalities	10 (2.4)
	Premature atrial contractions	6 (1.4)

Patients presented with more than one symptom, i.e., recurrent nasal obstruction 428 (100%), mouth breathing 421 (98.4%), and snoring and noisy breathing 411 (96%). Indications for surgery were adenoid and tonsillar hypertrophy 378 (88.3%), tonsillar hypertrophy 104 (24.3%), and recurrent adenitis 62 (14.5%). Recurrent AO symptoms occurred in 53 (12.4%), of whom 5 (1.2%) had repeat surgeries. Predisposing factors to recurrence were allergy (65%), < 1year (5%), and no identifiable factor (29%) (Table 2).

General anaesthesia without muscle relaxation was used in 132 (30.8%) patients. Adenotonsillectomy had the highest mean blood loss, 50 ± 2.5ml. Analgesic protocol was paracetamol alone 45.1%, paracetamol and diclofenac 32%, paracetamol and ibuprofen 13.1%, paracetamol and tramadol 7.9%, and opioids 3.4%. Postoperative complications were postoperative pain 45 (10.5%), fever 81 (18.9%), PONV 76 (17.6%), and respiratory problems 6 (1.4%). No mortality was recorded (Table 3).

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Table 2: Presenting features, indications, and factors associated with recurrence (n – 428)

Variables	Freq - N (%)
*Presenting symptoms	
Recurrent nasal obstruction	428 (100)
Mouth breathing	421 (98.4)
Snoring and noisy breathing	411 (96)
Obstructive breathing during sleep	389 (90.8)
RTI	392 (91.6)
Rhinorrhea	297 (69.4)
*Indications	
Adenoid and tonsillar hypertrophy	278 (65.0)
Tonsillar hypertrophy	104 (24.3)
Adenoid hypertrophy	46 (10.7)
Recurrent adenitis	62 (14.5)
Obstructive sleep apnea	18 (4.2)
Tonsillar abscess	3 (0.7)
Chronic otitis media	44 (10.3)
Recurrence (1 – 3 years post-surgery)	
Recurrent symptoms	53 (12.4)
Repeat surgeries performed	14 (3.3)
Patients managed conservatively	39 (9.1)
Factors predisposing to recurrence	(n = 53)
Allergic predisposition	33 (62.3)
Age < 1 year at initial surgery	7 (13.2)
Fibrotic healing /scarring	4 (7.5)
No identifiable factor	9 (17.0)

*More than one for each patient

Table 3: Surgical and anaesthesia outcomes (n-428)

Variable	Category	Freq - N (%)
Anaesthesia technique	GA+ TI + MR	296 (69.2)
	GA + TI only	132 (30.8)
Mean blood loss (ml)	Adenoidectomy	20 ± 2.2
	Tonsillectomy	36 ± 4.4
	Adenotonsillectomy	50 ± 2.5
Mean PCV drop (%)	Adenoidectomy	1.1 ± 0.2
	Tonsillectomy	2.4 ± 0.3
	Adenotonsillectomy	3.0 ± 0.2
Analgesia	Paracetamol	193 (45.1)
	Paracetamol + Diclofenac	137 (32.0)
	Paracetamol + Ibuprofen	56 (13.1)
	Paracetamol + Tramadol	34 (7.9)
	Tramadol or Morphine alone	13 (3.4)
Postoperative complications	PONV	76 (17.6)
	Postoperative pain	45 (10.5)
	Haemorrhage	9 (2.1)
	Fever	81 (18.9)
	Respiratory problems	36 (8.4)
	Wound infection	3 (0.7)
	Mortality	0 (0)

* GA – general anaesthesia, TI – tracheal intubation, MR – muscle relaxation

DISCUSSION

This study presents a comprehensive retrospective analysis of adenoid and tonsillar surgeries and offers useful data on the demographics, surgical profile, and outcome in Nigeria. It corroborates the fact that with proper planning and attention to details, paediatric adenotonsillectomies can be successfully done in low-resource countries, with no mortality.

First, meticulous preoperative assessment, surgical and anaesthesia techniques, and postoperative care are the cornerstones of successful adenoid and tonsillar surgeries.[11] Adenotonsillectomy considerations are recurrent obstruction, infection, difficult airway, co-morbidity, e.g., congenital heart disease, haemostasis, safe anaesthesia protocols, and decreased complication rate, e.g., pain, respiratory problems, bleeding, and PONV.[11,12]

Good communication, collaboration, and teamwork determine adequate preoperative care.[11] In our center, preoperative assessments are done at the ORL clinic by a specialist. There is optimisation of the cardiac and respiratory systems, weight, hydration, blood volume, use of antibiotics, and a review by the Anaesthetist.

In this study, we reported a mean age of 5.7 ± 3.2 years, peak age of 2 – 5 years at presentation, and a male-to-female ratio of 1.6:1 among 428 children who had adenoidectomies and adenotonsillectomies in our center over five years. This is consistent with the global and

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regional pattern, where adenoid and tonsillar hypertrophy peaks below 5 years due to lymphoid hyperplasia.[13]

The mean age mirrors the findings from other African studies and highlights the biological profile and socio-cultural health-seeking behaviors.[14,15] The tonsillar size grades III and IV correlate with obstructive symptoms and the indication for surgery. However, Cormack and Lehane's grades I and II airway assessment indicate a relative ease of intubation, which is a vital consideration in paediatric anaesthesia. Most children presented with episodic nasal obstruction, mouth breathing, snoring, and noisy breathing from enlarged adenoids, tonsils, infections, and sleep apnea, which is common in Nigeria.[14,15,16]

Similarly, Adegbiji et al[14] reported a peak age of 1 – 5 years, a male-to-female ratio of 1.5:1 among Nigerians. Shuaibu et al[15] reported a 1.2:1 male-to-female ratio, age 2 – 16 years, snoring and rhinorrhea as the commonest symptoms, and adenotonsillectomy as the commonest surgery. Olusesi et al[16] reported a mean age of 5 years, 56% are below 3 years, with family history of allergy, atopic dermatitis, and allergic rhinitis as predisposing factors. Adekwu et al[17] reported a mean age of 6.63 ±7.78 years, peak age below 5 years, obstructive hypertrophy is the commonest indication, and PONV and fever are postoperative complications. Samdi et al[18] reported a mean age of 3.5 ± 2.43 years, and a female ratio of 1:0.8, obstructive symptoms as surgical indications, a 96.2% cure rate, and no mortality.

Second, effective intraoperative care should include smooth anaesthesia, meticulous tissue handling and haemostasis, stable haemodynamics, euvolemia, normo-oxygenation, and normothermia. [12,19]

In our study, while muscle relaxation was used in 65% of cases, 45% were done without a muscle relaxant, reducing the risk of residual muscle paralysis, respiratory problems, and facilitating faster recovery.[11,12,19] Thus, volatile agents or propofol-based anaesthesia without paralysis can produce a positive outcome with vigilant monitoring in resource-constrained settings.[11]

The minimal blood loss in adenotonsillectomy with stable postoperative haemogram emphasises safety. It is useful in shared airway surgeries where blood loss can be difficult to quantify. The use of meticulous surgery, senior specialist, haemostatic technique, e.g., electrocautery, coblation, etc., as well as stable intraoperative haemodynamics is vital. This could be cost-effective and preclude unnecessary transfusion.[20]

Third, effective postoperative care is also vital. Patients are extubated awake, in tonsillar position, relaxation is fully reversed (if used), clear airway, discontinued anaesthesia, and on 100% oxygen. They are often monitored on the table for a while before transfer to the recovery room for monitoring and other supportive care.[11,12,19]

It was found that postoperative analgesia was adequate with paracetamol, NSAIDs, and opioids as monotherapy or in combination. While NSAIDs are associated with bleeding, we report no haemorrhagic cases, corroborating the studies that affirm their safety profile.[21]

While surgical complications were minimal, postoperative pain (10.5%), PONV (17.6%), and fever (18.5%) were seen. Respiratory compromise was rare and resolved with oxygen supplementation. Importantly, no mortality was recorded, further reinforcing the safety of these procedures.[11,19]

This study found a 12.4% recurrence rate with 3.3% needing repeat surgery. The recurrence rate is linked to allergic rhinitis (65%) and low age <1 year at first surgery (5%). Allergies are the main predisposing factor to adenoid hypertrophy and regrowth, due to chronic inflammatory stimulation. This underscores the clinical need for pre- and postoperative allergy assessment and care as an adjunct to surgical therapy.[13] Early age at first surgery, while sometimes necessary, is linked with recurrence due to incomplete regression of lymphoid tissue maturation.[22] Age below 2 years correlated with allergy and recurrence.[13,22] Age < 1 year, syndromic anomalies, cardiorespiratory diseases, coagulopathy, malnutrition, and sickle cell diseases are predisposing factors to adenoid and tonsillar hypertrophy in Nigeria.[14]

Limitation: The retrospective design, while adequate, decreases the ability to control for all confounding variables. Some cases lacked detailed long-term follow-up records, which may have underestimated recurrence rates or delayed complications. However, the study provides a solid foundation for prospective outcome monitoring and quality improvement in pediatric ORL surgeries in a low-resource setting.

Conclusion: Adenoid and tonsillar surgeries are effective procedures with low complication rates and satisfactory outcomes in our center. Recurrence is linked to modifiable factors like allergies and early age. Anaesthesia and analgesic protocols were safe and

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effective, underscoring the ability of low-resource centers to deliver high-quality ORL procedures. Improved preoperative evaluation and long-term follow-up are needed to optimise outcomes. With careful planning, attention to details and teamwork, adenoid and tonsillar surgeries can be successfully done in low-resource countries.

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Abbreviation

a. AO – airway obstruction
b. SDB - sleep-disordered breathing
c. URTI - upper respiratory tract infection
d. LIC – low-income countries
e. OSA - obstructive sleep apnea
f. OME – otitis media with effusion
g. PONV - postoperative nausea and vomiting
h. ORL – otorhinolaryngology
i. GA – general anaesthesia
j. TI – tracheal intubation
k. MR – muscle relaxation
l. ASA – American Society Anesthesiologist

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