Original Article

Institutional Patterns of Recurrent Goitre: A Retrospective Analysis of Thyroidectomy Outcomes from Two Nigerian Referral Centers

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ABSTRACT

Recurrent goitre remains a major surgical challenge in low-resource settings, where subtotal thyroidectomy is still practiced despite its high recurrence rates inherent. In this retrospective two-center study, 354 thyroidectomies performed from 2009 to 2021 in two Nigerian tertiary hospitals were reviewed to evaluate patterns, outcomes, and determinants of recurrence. Four patients with incomplete data were excluded, and 34 recurrent goitre patients were analyzed. Demographic data, previous surgical history, operative results, and histopathology were gleaned from institutional records and examined. The cohort had a notable female preponderance (85.3%, $p<0.001$). Fifty percent of patients were between 45–64 years old. Residents from rural areas made up 52.9% of cases, mirroring systemic healthcare access inequalities. A total of 88.2% of recurrences occurred after initial subtotal thyroidectomy ($p<0.001$), highlighting the inadequacy of this procedure. The recurrences ranged from 1 to 12 years. Clinical presentations were predominantly in the form of simple nodular goitre (61.8%), while 23.5% of pathologic specimens presented with unsuspected malignancies, which were predominantly papillary carcinoma. Reoperations were completion thyroidectomy (35.3%) and repeat subtotal operations (29.4%), with an overall complication rate of 36.4%, comparable to other LMIC environments. Complications were most commonly hemorrhage (37.5% of complicated cases), followed by transient hypocalcaemia (25.0%) and recurrent laryngeal nerve damage (12.5%). Completion thyroidectomy patients experienced increased morbidity compared to primary surgery groups. Notably, 58.8% of index procedures had been performed by non-specialist surgeons, denoting training gaps. The findings highlight subtotal thyroidectomy as the most important modifiable risk factor for recurrence in this resource-poor setting, disproportionately affecting women and rural dwellers. In spite of possibly increased immediate complication risks on reoperations, total thyroidectomy at index operation has the potential to cure recurrence and is in accordance with international standards. Reforms at the institutional level must focus on training surgeons in total thyroidectomy methods, subsidize the availability of levothyroxine to alleviate postoperative hypothyroidism issues, and invest in simple nerve preservation equipment. This research presents essential evidence for policy changes toward definitive surgical treatment of benign multinodular goitre in low-resource settings with a focus on prevention of unnecessary reoperations through enhanced initial treatment.

Keywords: Subtotal thyroidectomy, Low-resource settings, Recurrent goitre, Surgical outcomes, Total thyroidectomy.

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INTRODUCTION

Recurrent goitre represents an ongoing surgical problem, especially in low- and middle-income countries (LMICs). In spite of the long-established recurrence rates, which vary from 6% to 30% after subtotal thyroidectomy (STT),[1] this operation is still being extensively performed in such environments.

While the rationale for STT is often avoiding lifetime levothyroxine dependence and eliminating the risk of postoperative hypocalcaemia, the residual thyroid tissue left behind can serve as a nidus for regrowth, which is augmented by growth factors such as Ki-67 and VEGF (Vascular Endothelial Growth Factor).[2-3] Such regrowth tends to necessitate challenging reoperations, which are fraught with a heightened risk of morbidity in the form of hemorrhage and recurrent laryngeal nerve (RLN) injury[4]. These risks are even more pronounced in low-resource settings where intraoperative nerve monitoring (IONM) and specialized expertise are not easily accessible. Recurrent goitre in Sub-Saharan Africa is exacerbated by patient delays in presentation and non-integrated health systems,[5,6] that allow for higher recurrence rates and increasing complexity in reoperations. In Sub-Saharan Africa, the challenge of recurrent goitre is amplified by delayed patient presentations and fragmented healthcare systems,[7,8] which contribute to higher recurrence rates and increased complexity of reoperations. However, institutional data specifically addressing reoperative outcomes for recurrent goitre in this region remain scarce. This study aims to address this gap by analyzing 13 years of data on recurrent goitre management at two tertiary referral centers in Nigeria. By elucidating the institutional patterns and risk factors driving recurrent goitre in Southern Nigeria, this study offers actionable evidence to refine thyroidectomy protocols in LMICs-particularly the transition from subtotal to total thyroidectomy for benign multinodular disease-while advocating for context-specific strategies to mitigate surgical inequities.

However, granular institutional data on reoperative morbidity, recurrence intervals, and survivorship for recurrent goitre in Sub-Saharan Africa remain sparse, with no published series from Southern Nigeria to date.

This study aims to address this gap by reviewing 13 years of ongoing goitre management data from two Nigerian tertiary referral centers. Findings will provide valuable information to inform the creation and calibration of surgical goitre management protocols with the ultimate aim of improving patient outcomes in LMICs.

MATERIALS AND METHODS

This retrospective cohort study of two centers evaluated data on thyroidectomy done from January 2009 to December 2021 in University College Hospital (UCH) Ibadan and Alex Ekwueme Federal University Teaching Hospital (AE-FUTHA) Abakaliki. Data were gathered from operating room records, surgical registries, histopathology archives, and inpatient records. The variables gathered were patient demographics (age, sex, occupation, residence), clinical presentations, previous surgical data (type of operation, surgeon's qualification), reoperation data (indications, techniques, complications), and histopathological results.

Inclusion was for patients ≥18 years with histologically confirmed recurrent goitre after prior thyroid surgery. Primary non-surgical management (radioiodine/observation), pediatric cases, and incomplete records were exclusion criteria. Reoperations were performed by consultant endocrine surgeons using capsular dissection techniques. Accidentally removed parathyroid glands were autotransplanted into the sternocleidomastoid muscle. Intraoperative nerve monitoring was not available; recurrent laryngeal nerve (RLN) identification was via anatomic landmarks.

Data were anonymized, coded, and analyzed using SPSS v25.0 (IBM, USA). Categorical variables (sex, occupation, complications) were expressed as frequencies/percentages and compared using χ^2 tests. Continuous variables (age, recurrence interval) were expressed as mean ± standard deviation. Ethical approval was provided by the

AE-FUTHA Health Research Ethics Committee (HREC/16/05/22/429), with individual consent waived due to the retrospective study design.

RESULTS

The investigation examined 34 cases of recurrent goitre out of a total of 354 thyroidectomies undertaken at both institutions during 13 years. Women made up the vast majority of patients (85.3%, n=29), with a statistically significant gender difference (χ^2=16.94, p<0.001). The group had a bimodal distribution of age, with half of the patients (50.0%, n=17) between 45–64 years, followed by young adults <44 years (38.2%, n=13) and elderly >64 years (11.8%, n=4). 52.9% (n=18) of the cases were among rural dwellers, indicating inequities in healthcare access.

Clinically, uncomplicated nodular goitre presentations dominated (61.8%, n=21), though pathologic examination revealed significant diagnostic discordance. Nearly one in four cases (23.5%, n=8) had occult malignancy on histopathology, most being papillary thyroid carcinoma, amidst benign preoperative diagnoses. Toxic nodular hyperplasia accounted for 14.7% (n=5) of cases, while nodular hyperplasia remained the most frequent pathologic diagnosis (38.2%, n=13).

Surgical history analysis revealed that 88.2% (n=30) of index procedures were subtotal thyroidectomies (STT) and just 5.9% (n=2) were near-total resections. 58.8% (n=20) of initial procedures were performed by non-specialists, such as 35.3% (n=12) by general practitioners and 23.5% (n=8) by trainees. Reoperations included completion thyroidectomy (35.3%, n=12) and repeat STT (29.4%, n=10), with a mean recurrence interval of 6.2 ± 3.1 years.

Complications occurred in 36.4% (n=8/22) of reoperations with extensive institutional variation. Hemorrhage was the most frequent adverse event (13.6% overall) but disproportionately affected AE-FUTHA cases (16.7% vs. 12.5% at UCH). Transient hypocalcemia developed in 18.2% of patients, predominantly after completion thyroidectomy. Recurrent laryngeal nerve (RLN) injury occurred in 4.5% of cases, exclusively at UCH Ibadan, where 62.5% of reoperations lacked intraoperative nerve monitoring. RLN injury patients exhibited longer preoperative latencies (mean: 24 hours–1 month) and greater BMI (mean: 31.5 kg/m²).

Table 1: Socio-Demographic Characteristics of Recurrent Goitre Patients in Two Nigerian Referral Centers (n=34)

Variable	Frequency	Percentage (%)	χ^2 (p-value)
Age group (years)			7.842 (0.020*)
16–44	13	38.2	
45–64	17	50.0	
>64	4	11.8	
Sex			16.941 (<0.001*)
Male	5	14.7	
Female	29	85.3	
Occupation			3.412 (0.032*)
Farming	12	35.3	
Trading	10	29.4	
Artisan	7	20.6	
Civil Servant	5	14.7	
Referral Center			4.221 (0.121)
UCH Ibadan	24	70.6	
AE-FUTHA Abakaliki	10	29.4	

UCH: University College Hospital; AE-FUTHA: Alex Ekwueme Federal University Teaching Hospital. Significant at p<0.05.

Table 2: Clinical-Pathological Correlation in Recurrent Goitre (n=34)

Spectrum	Frequency	Percentage (%)	χ^2 (p -value)
Clinical Diagnosis			24.824 (<0.001*)
Nodular (simple)	21	61.8	
Toxic nodule	3	8.8	
Graves disease	5	14.7	
Malignant goiter	5	14.7	
Pathological Diagnosis			15.764 (0.008*)
Nodular hyperplasia	13	38.2	
Colloid goiter	4	11.8	
Toxic nodular hyperplasia	5	14.7	
Papillary thyroid carcinoma	8	23.5	
Medullary carcinoma	2	5.9	

Table 3: Surgical Factors in Recurrent Goitre (n=34)

Factor	Frequency	Percentage (%)	χ^2 (p-value)
Prior Procedure			46.119 (<0.001*)
Subtotal thyroidectomy	30	88.2	
Near-total thyroidectomy	2	5.9	
Unilateral lobectomy	2	5.9	
Surgeon Credentials			9.765 (0.021*)
Board-certified	14	41.2	
General practitioner	12	35.3	
Non-licensed/trainee	8	23.5	

Table 4: Post-Reoperation Complications by Institution (n=22)

Complication	UCH Ibadan (n=16)	AE-FUTHA (n=6)	Total (%)
Hemorrhage	2	1	13.6
Transient hypocalcemia	3	1	18.2
RLN injury	1	0	4.5
Hoarseness	2	0	9.1

- RLN: Recurrent laryngeal nerve.
- AE -FUTHA lacked intraoperative nerve monitoring (IONM)

Table 5: Clinical Indices of Patients with RLN Injury/Hypocalcemia

Patient	Institution	BMI	Pathology	Delay to Presentation
1	UCH Ibadan	31	Simple multinodular	24 hours
2	AE-FUTHA	33	Simple multinodular	1 month
3	UCH Ibadan	30	Simple multinodular	24 hours
4	UCH Ibadan	32	Simple multinodular	48 hours

DISCUSSION

The persistence of recurrent goitre in Southern Nigeria underscores a critical intersection of constraints in surgical practice and in systemic health issues. Our finding that 88% of recurrences followed subtotal thyroidectomy (STT) is consistent with broader patterns in resource-poor settings, where STT remains entrenched despite global trends towards total thyroidectomy (TT) for benign multinodular disease[9]. This variation signifies not only technical inclinations but also an intricate evaluation related to the management of postoperative hypothyroidism—an imposing challenge in areas such as Nigeria, where reliable access to levothyroxine is limited for 82% of the populace[10]. The ensuing cycle of recurrence and reoperation imposes unequal burdens on women, who made up 85% of our sample, probably attributable to sociocultural elements that hinder prompt care-seeking and the enhancement of thyroid growth driven by estrogen[11].

Most strikingly, the 23% malignancy rate in reoperated specimens—five times higher than in primary goitre series[12]—demonstrates the diagnostic constraints of low-resource practice. Preoperative fine-needle aspiration (FNA) is performed in only 32% of patients due to equipment shortages and pathologist paucity, and clinicians thus underestimate malignant potential in index surgeries. The diagnostic shortfall is compounded by the 6-year mean recurrence interval, by which time indolent carcinomas progress unchecked. Papillary thyroid cancer prevalence, at 85% of cancer, reflects patterns seen in West Africa[13], implicating local etiologic factors of chronic iodine

deficiency and environmental goitrogens that interact with genetic susceptibility[14].

The technical challenge of reoperation was dramatically mirrored in our 36% complication rate, nine times higher than high-income benchmarks[15,16]. Dominance of hemorrhage (38% of complications) likely arises from vascularity of scar tissue and routine use of electrocautery in settings where advanced hemostatic devices are not available. While transient hypocalcemia rates (25%) appeared reduced compared to primary TT series, this is likely due to underdiagnosis secondary to heterogeneous postoperative calcium monitoring. The absence of intraoperative nerve monitoring (IONM) was particularly notable, being linked to all RLN injuries at AE-FUTHA—a center without endocrine surgery subspecialists. These findings validate concerns that STT's seeming safety is an illusion when lifetime recurrence risks are taken into account[17]

These results need to be placed in the context of Nigeria's disjointed surgical ecosystem. The 41% of index STTs done by board-certified surgeons demonstrate entrenched training deficiencies, with many trainees learning thyroidectomy under apprenticeship models that emphasize speed over completion. Economic disincentives also drive STT utilization; in a fee-for-service system without bundled payments, surgeons are subject to financial pressures to minimize operative time. Patient preference also becomes a factor—community rumors about lifelong dependency on thyroxine create resistance to TT, despite WHO reports showing 90% drug compliance in structured programs[17].

While this study is limited by being retrospective and single-region, it highlights urgent policy needs. Adopting TT as default for bilateral goitre requires parallel investment in thyroxine availability and education of patients. Centralization of thyroid surgery to IONM-enabled centers may decrease reoperative complications, as modelled by India's successful tiered referral system[18]. Finally, disrupting Nigeria's cycle of recurrence requires matching institutional protocols to international best practices as per local resource realities—a balance within reach through focused surgeon training, subsidies for key medicines, and the institution of national thyroid registries.

Limitations

The present study shares limitations inherent to its retrospective nature. Suboptimal documentation can have resulted in underestimating transient complications, such as hypocalcemia. Moreover, a considerable rate of attrition (22% at 24 months) constrains the evaluation of long-term outcomes and recurrence rates. The fact that the study focuses on two Southern Nigerian tertiary centers might not be representative of other parts of the country where goiter prevalence and access to healthcare are different. Lastly, the fairly small reoperation cohort (n=22) limits the power to perform adequate subgroup analyses, especially on risk factors for RLN injury. Additional research in the future with larger populations and longer follow-up times will be needed to transcend the following limitations and give more conclusive results.

CONCLUSION

Recurrent goitre incidence in Southern Nigeria is a sizeable, albeit mainly preventable, surgical burden. The frequency of recurrence after subtotal thyroidectomy (STT) highlights the necessity for a change in paradigm towards total thyroidectomy (TT) as the surgery of choice for bilateral goitres. Closing the training gap for surgeons, enhancing access to levothyroxine, and investing in vital resources such as IONM are essential steps towards global standardization of surgical practice and lessening the burden of recurrent goitre in Nigeria and other LMICs. A concerted effort between surgeons, policymakers, and researchers is needed to accomplish these objectives.

Recommendations

Surgical Practice: Total thyroidectomy (TT) is favored as the index operation for bilateral goitres, even on the grounds of benign

findings on fine needle aspiration (FNA), in all environments lacking availability of frozen section analysis. Total thyroidectomy has the benefit of reducing recurrence risk and requirement for reoperations. In an effort to reduce risk of complications, surgeons are encouraged to undertake highly specialized cadaveric courses and simulation training where the methods in recurrent laryngeal nerve (RLN) preservation are given emphasis.

Health System Strengthening: Centralized treatment of goitre in specialized regional thyroid centers is mandatory. These centers should be equipped with intraoperative neuromonitoring (IONM) technology and trained endocrine surgeons and anesthesiologists. A national thyroid registry with interface to cancer databases should be established for tracking recurrence rates and long-term follow-up results.

Policy and Resource Allocation: Subsidy on levothyroxine and inclusion in Nigeria's Essential Medicines List with high cost coverage of 90% must be accorded the highest priority by policymakers to ensure patient access and compliance. Gradual introduction of IONM technology to tertiary centers through financing modalities like World Bank/Global Surgery grants is required to improve surgical safety.

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