

## ORIGINAL PAPER

# Patterns of Surgically Treated Thyroid Disease in Lusaka, Zambia

\*Furkat Mirzakarimov, BFK Odimba, Penias Tembo

University Teaching Hospital (UTH), Lusaka  
Department Of Surgery

## ABSTRACT

**Background:** Thyroid gland disease is a common disorder of the endocrine system worldwide. This disease varies according to the environment. The aim of this study is to determine demographic and histopathologic patterns of thyroid disease at the University Teaching Hospital, Lusaka, Zambia.

**Methods:** This was a retrospective review of patients records (n=239) over a ten year period (2001-2010) at the University teaching Hospital, Lusaka, Zambia. Rate of thyroidectomies, demographic characteristics (age and gender), histologic types and regions where patient came from (for clustering) were analysed.

**Results:** A total of 3475 general surgical operations were done in a 10-year period. Of these 252(7.25%) were for thyroid surgery. 239 thyroid specimen results were found.

They were from 212 females and 27 males with female: male ratio of 7.8:1. There were 172 cases (71.96%) of colloid goitre (the most common thyroid disease) followed by 33 cases of thyroid neoplasms (n=33, 13.8%). Benign tumour i.e., adenoma were seen in eight (3.3%) cases and thyroid carcinoma in 26 (10.8%) cases. Thyroiditis constituted three (1.2%) of the cases. Thyroid cyst accounted 19(8.1%) and Toxic goitre nine(3.8%) cases. Age range for colloid goitre was 19-89, malignancy 19-69, thyroid adenoma 19-69 and toxic goitre 20-69. Colloid goitre had a peak at age group 31-49 years. Follicular carcinoma was the commonest malignant thyroid tumour (15 cases). Peak age for thyroid malignancy 30-59. Most patients were from Lusaka (n=103) followed by Eastern province (29 patients).

**Conclusion:** This study showed that thyroid surgery constituted a significant proportion of major surgical operations. Colloid goiter (a preventable disease), was the commonest thyroid disease in this study. Thus, public

health measures such as iodination of salt and health education could play a role reducing the occurrence of this disease and of related surgery. Females mostly affected. A thyroid carcinoma pattern differs from other parts of world. Follicular carcinoma is common in sub-Saharan Africa. In the Western world papillary carcinoma is more common. A further prospective study is expected to bring more statistical data.

## INTRODUCTION

Thyroid enlargement or goiter is a common disorder of the endocrine system worldwide including Zambia. The thyroid gland is affected in many conditions. The principal diseases of the thyroid gland are goitre (diffuse or nodular), hypothyroidism, hyperthyroidism, thyroiditis and neoplasms<sup>1</sup>. Benign thyroid conditions are much more common.

Simple (non-toxic) goitre is extremely common condition throughout the world and is thought to affect more than 200 million individuals. Iodine deficiency is the major cause but goitrogens are incriminated as well<sup>1</sup>.

The reported incidence of both benign and malignant lesions in surgically treated thyroid swellings varies widely from one geographical area to another.

Of the world's 191 countries, iodine deficiency disorders (IDD) was a public health problem in 130, and data was insufficient to categorize another 41<sup>2</sup>.

The prevalence of iodine deficiency disorders (IDDs) in most African countries ranges from mild in low-lying areas to severe in highlands. Zambia is grouped among countries worldwide believed to have an iodine-deficiency disorder problem of public health significance<sup>3</sup>.

Despite being benign or malignant, the goiter may have its own morbidity and mortality in relation to its size on the

management. Thyroid surgery constitutes a significant proportion of major elective general surgery in the developing world. For example, in Kijabe, Kenya, 100 thyroidectomies are carried out annually and in Papua New Guinea there were 376 thyroid specimens sent to pathology laboratory over a 10-year period. The vast majority of cases are operated on electively rather than as an emergency and by general surgeons or otorhinolaryngologists. The management of thyroid disease presents a challenge because patients in countries where health facilities are poor normally present with advanced disease<sup>4</sup>.

The purpose of this retrospective study is to find out the frequency and to identify various histological types of thyroid lesions as seen at UTH in the last 10 years. We do not have recent data as regards histopathologic patterns in surgically treated thyroid disease at UTH.

## METHODS

This is a retrospective study of data of patients operated with thyroid disease over a ten year period (2001-2010) at the University teaching Hospital, Lusaka, Zambia. Rate of thyroidectomies, demographic characteristics (age and gender), histological types and regions where patient came from (for clustering) were analysed.

## RESULTS

### Distribution of thyroid surgery over 10 years at UTH

A total of 3475 general surgical operations were done in 10-year period from 2001-2010 in Phase 3 theatre at UTH. Out of this 252 or 7.3% thyroid operations (Table 1). In 2009 highest number of thyroid surgery done 38 or 12.2% cases.

**Table 1** Distribution and proportion of thyroidectomies over 10 years (2001-10) at UTH.

Year	Operations	Thyroid surgery	%
2001	413	29	7.0%
2002	466	28	6.0%
2003	363	18	5.0%
2004	382	25	6.5%
2005	398	23	5.8%
2006	330	21	6.4%
2007	287	25	8.7%
2008	238	29	12.2%
2009	297	38	12.8%
2010	301	16	5.3%
<b>Total</b>	<b>3475</b>	<b>252</b>	<b>7.3%</b>

### Histological patterns of thyroid specimens

A total of 252 thyroid operations were done. Of these 239 thyroid specimens histology results found. Colloid goitre accounted for 172 (71.96%) cases. Thyroid neoplasms were encountered in 33 (13.8%) cases only. The benign tumour i.e., adenoma were seen in seven (2.92%) cases and thyroid carcinoma in 26 (10.8%) cases. Thyroiditis constituted three (1.25%) of the cases Thyroid cyst accounted 19 (7.94%) and Toxic goitre 9 (3.76%) case (Table 2).

**Table 2.** Histopathological patterns of thyroid diseases in 239 thyroidectomy specimens (UTH, 2001-10)

HISTOPATHOLOGY RESULT	No	%
COLLOID GOITRE	172	72%
THYROID CYST	19	7.9%
TOXIC GOITRE	9	3.8%
THYROID ADENOMA	7	2.9%
MULTINODULAR GOITRE	3	1.3%
THYROIDITIS	3	1.3%
CARCINOMA	26	10.9%
<b>TOTAL</b>	<b>239</b>	<b>100.0%</b>

### Gender distribution of patients whose thyroid specimens examined histologically

Of the 239 cases, 212 (88.7%) were in females and 27 (11.3%) were in males. The female: male ratio was 7.8:1. All types of thyroid disease more common in females. (see Table 3).

### Age distribution of patients with specimens examined

The average age for a patient with thyroid diseases was 42.24 ± 12.42 years (range 19-82 years).

The majority of the cases, that is 86.6% of the thyroid diseases in this study, were seen in the age group 20-59 years, the young age group 0-19 years and the elderly group above 60 years constituted 2.5% and 10% respectively. The age distribution of the specific thyroid disease entities as shown in Table 4.

### Distribution of thyroid malignancies (UTH, 2001-10)

There were 26 cases of thyroid malignancies in study ((10.9% of all specimens examined). The morphological subdivision of the 26 thyroid carcinomas showed 69.2% were follicular, 15.4% papillary, 7.7% anaplastic, and

**Table 3.** Distribution of the histologic thyroid diseases in relation with gender of patient

Gender	Colloidgoitre n (%)	Multi- nodulargoitre N (%)	Thyroidade noma n (%)	Thyroidcyst n (%)	Thyroid-itis n (%)	Toxicgoitre n (%)	Carcinoma n (%)	Total N (%)
<b>F</b>	157 (91.3)	3 (100)	5 (71.4)	18 (94.7)	2 (66.7)	9(100)	18 (69.2)	212 (88.7)
<b>M</b>	15 (8.7)	0 (0)	2 (28.6)	1 (5.3)	1 (33.3)	0 (0)	8 (30.8)	27 (11.3)
<b>Total</b>	172 (100)	3 (100)	7 (100)	19 (100)	3 (100)	9(100)	26 (100)	239 (100)
<b>Row %</b>	<b>72.0%</b>	<b>1.3%</b>	<b>2.9%</b>	<b>7.9%</b>	<b>1.3%</b>	<b>3.8%</b>	<b>10.9%</b>	<b>100.00%</b>

**Table 4.** Distribution of the histological thyroid disease in relation with age

Age	Colloidg oitre	Toxicg oitre	Multi- nodular goitre	Thyroidad enoma	Thyroid cyst	Thyroid - itis	Papillary ca	Follicula rca	Undiff entiated	Ana plas tic	Total
10-19	3	0	0	1	1	0	0	1	0	0	6
20-29	27	3	0	0	0	1	0	0	0	0	31
30-39	47	3	1	2	5	0	1	4	1	0	63
40-49	60	2	2	2	8	2	0	6	0	1	81
50-59	20	1	0	1	4	0	2	4	1	0	32
60-69	10	3	0	1	1	1	1	3	0	1	21
70-79	3	0	0	0	0	0	0	0	0	0	3
80-89	2	0	0	0	0	0	0	0	0	0	2
<b>Total</b>	<b>172</b>	<b>9</b>	<b>3</b>	<b>7</b>	<b>19</b>	<b>3</b>	<b>4</b>	<b>18</b>	<b>2</b>	<b>2</b>	<b>239</b>
Row%	71.96%	3.85%	1.28%	3.39%	8.12%	1.28%	1.67%	7.53%	0.8%	0.8%	100%

**Table 5:** Distrubution of thyroid malignancies

Thyroid Carcinomas	No	%
Follicular	18	69.2%
Papillary	4	15.36%
Anaplastic	2	7.69%
Undifferentiated	2	7.69%
<b>Total</b>	<b>26</b>	<b>100%</b>

7.7% undifferentiated carcinoma. As the study showed follicular carcinoma was commonest (Table 5). Thyroid malignancies were common in female 18 (69.23%) than male 8 (30.76%) Female to male ratio 2.2:1. (Table 6)

**Table 6:** Distribution of thyroid malignancies by gender

Thyroid Carcinomas	female	male	Total N (%)
Follicular	13	5	18 (69.2)
Papillary	3	1	4 (15.36)
Anaplastic	1	1	2 (7.69)
Undifferentiated	1	1	2 (7.69)
<b>Total</b>	<b>18 (100)</b>	<b>8 (100)</b>	<b>26 (100)</b>

The average age for a patient with thyroid malignancies was  $48.75 \pm 12.48$  years (range 19-69 years). (Table 7)

**Table 7.** Distribution of thyroid malignancies by age

Age	Follicularca	Papillaryca	Anaplastic	Undifferentiated	Total
10-19	1	0	0	0	1
20-29	0	0	0	0	0
30-39	4	1	1	0	6
40-49	6	0	0	1	7
50-59	4	2	1	0	7
60-69	3	1	0	1	5
70-79	0	0	0	0	0
80-89	0	0	0	0	0
Total	18	4	2	2	26

**Geographical distribution of thyroid disease**

Out of 239 patients with thyroid disease whose histology results were available, 103 (43%) came from Lusaka, 29 (12.1%) from Eastern province, 23 (9.8%) Central province, 26 (10.8%) Southern province, 17 (7.1%) Northern province, 16 (6.6%) were from Copperbelt. From Luapula, Western and North-Western provinces 12 (5%), 11 (4.6%) and 5 (2%) respectively. Table 8 and Figure 8 shows distribution of provinces patients with thyroid disease came from operated at UTH in 10 year period with histopathology results. (Table 8)

**Table 8:** Distribution of patients with thyroid disease operated at UTH in 10 year period with histopathology results

PROVINCE	HISTOPATHOLOGY RESULTS									Total
	Colloid goitre	Thyroid cyst	Multinodular goitre	Toxic goitre	Thyroid adenoma	Thyroiditis	Follicular ca	Papillary ca	Anaplastic + Undifferentiated	
Central	14	3	1	0	1	1	3	0	0	23
Copperbelt	13	1	0	1	0	0	1	0	0	16
Eastern	19	2	0	1	1	0	4	2	1	29
Luapula	10	1	0	0	0	0	1	0	0	12
Lusaka	73	9	1	6	4	2	5	1	2	103
Northwestern	3	0	0	0	0	0	2	0	0	5
Northern	13	1	1	0	1	0	1	0	0	17
Southern	22	2	0	0	1	0	1	0	0	26
Western	8	0	0	1	0	0	0	1	1	11
Total	172	19	3	9	7	3	18	4	4	239

**DISCUSSION**

Thyroid diseases are of great importance because most are amenable to medical or surgical management. This study showed thyroid surgery 7.25% of general surgical major operations done at UTH in 10-year period. Peak incidence of thyroid surgery were in 2009, 38 cases recorded. Figure 1 shows distribution and proportion of thyroid surgery. Thyroid surgery constitutes a small but significant proportion of major elective general surgery in the world. Thyroid surgery in developed and developing countries has been shown. The developing world in this case includes parts of Asia and sub-Saharan Africa. In a study done in South West Thames region (UK) over a 6 month period. The frequency of thyroidectomy in different hospitals varied from 13 to 35 per 100 000 per year and 6.4% of the operations were second thyroidectomies. In Papua New Guinea, there were 376 thyroid specimens sent to pathology laboratory over a 10-year period and in Kijabe, Kenya 100 thyroidectomies are carried out annually. [4] A retrospective study done in Leo/Burkina Faso. Study showed during a 7-year period from 2001 to 2008. A total of 253 cases presented with goitres grade III (WHO classification) and were operated on: 134 hemithyroidectomies, 108 hemithyroidectomies combined with subtotal contralateral resection, and 11 total thyroidectomies were performed. The results obtained by our study present a number of thyroidectomies significant proportion of major surgical cases and conforms to other parts of the world.

In this study, colloid goitre accounted for 71.96% (172 cases) forming the most common pathologic presentation. From literature review benign thyroid diseases common than malignancies and colloid goitre is common cause of thyroid diseases in developing world including sub Saharan Africa. Thyroid disease common in females than males. In this study, female male rate was 7.8:1. Age range was 19 to 82 years. In Karachi, Pakistan study showed that Multinodular goiter was the commonest thyroid disease (61.63%) out of 662 cases. Female: male ratio 6.19:1 The age range was from 12 to 70 years<sup>7</sup>. Study from Ethiopia showed female to male ratio was 4.5:1 and 79, 9% were Nodular colloid goiter cases (NCG). The study done in Ile-Ife, Nigeria the 274 thyroid specimens reviewed out of this 75% were colloid goitre. 85.8% females and 14.2% males giving a female: male ratio of 6: 1<sup>12</sup>. It

was the expectation of the study that females were more affected by thyroid disease and benign conditions more common. Expectation supported by literature.

Thyroid cancer represents approximately 0.5–1% of all human malignancies worldwide.<sup>8</sup> The overall incidence of malignancy in this study was 6.8%. Figure 6 shows distribution of thyroid malignancies. In USA, it was 5.8%, in Libya 9.7% and in South Africa 5.4%.<sup>7</sup> Privies study done at UTH showed overall incidence malignancies 16.4%. Follicular carcinoma was commonest 42%, followed by Papillary 10% and Anaplastic carcinoma 30%<sup>10</sup>.

In this study Follicular cancer were most common malignancy in this study were 15(68%) followed by Papillary 3(14%). Anaplastic carcinoma 2(9%) and Undifferentiated carcinoma 2(9%) were seen. Study done in Bahrain showed overall malignancies 24% and all histology result showed papillary carcinoma only type malignancy in study period<sup>11</sup>. In Nigeria, study showed overall incidence of malignancies 11% and commonest was Follicular carcinoma.<sup>12</sup>

Study showed that malignancy common in females than males almost double times.

As we have seen from literature, a pattern of thyroid cancer in Sub Saharan Africa differs from other parts of world. Follicular carcinoma more common in this part of world. The cause of thyroid carcinoma is not known, but there are some predisposing factors. Head and neck irradiation in childhood is a known predisposing factor, mainly for the papillary type. There is also experimental evidence suggesting an association between prolonged high levels of thyroid stimulating hormone (TSH) and thyroid follicular adenoma and carcinoma. From literature iodine deficient areas are known to have a high frequency of follicular carcinoma.

Study showed that most cases with thyroid disease came from Lusaka. It is explained that population of capital city is high than other parts of country and other central hospitals in the provinces thyroidectomies being done.

## CONCLUSIONS

Thyroid surgery constitutes a small but significant proportion of major elective general surgery at UTH. It is 7.25% of all elective general surgical cases.

Colloid goitre commonest cause of thyroid swelling in this study 71.96%.

Thyroid disease common in females than males, ratio 7.8:1 respectively.

Overall incidence of malignancy was 6.8% Follicular cancer was commonest thyroid malignancy in this study.

Statistical data about the disease not only provides clues to the aetiology but it also helps in the development of plans regarding control and prevention of disease.

## REFERENCES

1. Tsegaye B, Ergete W. Histopathologic pattern of thyroid disease. *East Afr. Med. J.* 2003; Oct; 10 (10):525-528.
2. International Council For Control Of Iodine Deficiency Disorders (ICCID) IDD NEWSLETTER, WHO REVIEW 1999. May; 15: 2
3. Kenji G, Nyerenda K, Kabwe G. Iodine levels in edible salt sold in Malawi, Kenya and Zambia. *Afr. J. Food Agriculture Nutrition and Development.* 2003; Nov; 2(3):1684-5374
4. Watters DAK, Jack W. Thyroid surgery in the tropics. *ANZ J. Surg.* 2007; 77: 933–940
5. Asimakopoulos G, Loosemore T, Bowyer R, McKee G, Giddings A. A regional study of thyroidectomy: surgical pathology suggests scope to improve quality and reduce cost. *Ann R Coll Surg Engl* 1995; 77: 425-430
6. Rumstadt B, Kirr H, Kaltenbach N, Homenu W, Schilling D. Thyroid Surgery in Burkina Faso, West Africa: Experience from a Surgical Help Program. *World J Surg.* 2008; Oct; 32: 2627-2630
7. Nazar H, Anwar M, Nadia N, Zulfiqar A. Pattern of surgically treated thyroid disease in KARACHI. *Biomedica.* 2005; Jan. – Jun; 21
8. Heitham G. Update on epidemiology classification and management of thyroid cancer. *Libyan J Med.* 2006; June; www.ljm.org.ly
9. Bukhari U, Sadiq S, Memon J, Baiga F. Thyroid carcinoma in Pakistan: a retrospective review of 998 cases from an academic referral center. *Hematol Oncol Stem Cell Ther* 2009; 2(2); 345-348.
10. Desai G, Islam R. The changing pattern of surgical pathology of the thyroid gland in Zambia. *Cent Afr J Med.* 1992 Jun; 38(6):240-2.
11. Abdulla H, Khalid A, Jihene K. Patterns of thyroid disease-A histopathological study. *Bahrain Medical Bulletin.* 2006 Dec; 28(4).
12. Nggada H, Ojo O, Adelusola K. A histopathological analysis of thyroid disease in Ile-ife, Nigeria. a review of 274 cases. *Nigerian postgraduate medical journal.* 2008 Mar.