

Hypothyroidism in Hospitals (Burkina Faso)

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Abstract

Background: The epidemiology of hypothyroidism has been characterized by an increase in its frequency, especially in females and the elderly. Our aim was to study hypothyroidism in hospitals in Ouagadougou. **Material and Method:** This was a cross-sectional descriptive study with retrospective data collection covering a period of four (04) years between January 1, 2015 and December 31, 2018. It included patients followed in the internal medicine departments of three (03) teaching hospitals in the city of Ouagadougou. Yalgado OUEDRAOGO, Bogodogo and Tengandogo Teaching Hospitals, were the study setting. **Results:** 120 cases of hypothyroidism were enrolled. The mean age of the patients was 45.7 years with a sex ratio of 0.26. The signs frequently reported were weight gain (28.3%), asthenia (15.8%), and myalgia (15%). TSHus was elevated in 99.2% of patients in our series. The T3L assay level was lowered in 40.9%, with an average of 2.2 ± 1.5 pg/ml. T4L was lowered in 68.2% with an average of 6.6 ± 4 pg/ml. Primary hypothyroidism accounted for 99.2% of the cases, of which iatrogenic hypothyroidism was the most frequent with 77.5% followed by Hashimoto's thyroiditis with 9.2% of the cases. Hormonal balance was achieved in the majority of patients (59.2%) who received hormonal supplementation with levothyroxine at an average dose of 84.5 μ g/day. **Conclusion:** Hypothyroidism is common in women in their forties. Iatrogenic hypothyroidism was the predominant etiology reported in Ouagadougou.

Keywords

Hypothyroidism, Hospital, Ouagadougou

1. Background

Since the development and refinement of the thyroid exploration tools, the epidemiology of hypothyroidism has been marked by an increase in its frequency, especially in females and advanced age individuals. Many studies have shown that hypothyroidism is one of the most common thyroid disorders [1] [2] [3].

Over the age of 40, frank and uncomplicated hypothyroidism affects about 1.1% to 12.2% of adults [3]. In the Wickham study in Great Britain, after 20 years of investigation, the annual incidence of hypothyroidism was 3.5/1000 in women and 0.6/1000 in men [4]. In France, the annual incidence of hypothyroidism was estimated at 1.53/1000 in women and 0.22/1000 in men.

In Africa, few studies have focused on hypothyroidism. In fact, apart from the cases of iodine deficiency hypothyroidism described, epidemiological and even hospital data on hypothyroidism were scarce in Sub-Saharan Africa. In Niger, the hospital frequency of peripheral hypothyroidism accounted for 18.3% of all dysthyroidism [5]. In central Africa, the frequency of hypothyroidism was estimated at 7.4% in Brazzaville [6] and 8.8% in Libreville [7].

Hypothyroidism is clearly more prevalent in women and its frequency increases with age. Between the ages of 20 and 70, this frequency increases from 4% to 21% in women and from 3% to 16% in men [8].

It also has a wide range of etiologies, classified according to the level of impairment, in central and peripheral hypothyroidism. Central or secondary hypothyroidism is due to a thyroid hormone deficiency caused by pituitary or hypothalamic impairment, estimated at 0.005% [9]. Peripheral hypothyroidism, also referred to as primary hypothyroidism, is due to damage to the thyroid gland. It is by far the most frequent type, representing more than 95% of hypothyroidism cases [10].

In Burkina Faso, much research has been devoted to endemic goiter and hyperthyroidism, but few studies have targeted hypothyroidism.

Our work therefore aims to provide data by studying hypothyroidism in the hospital environment in Ouagadougou by describing its frequency, its semiology and identifying its different etiologies.

2. Methodology

The three main third-level reference health facilities in the national health pyramid in Burkina Faso, *i.e.*, Yalgado OUEDRAOGO, Bogodogo and Tegangogo Teaching Hospitals, were the study setting. This was a cross-sectional descriptive study. The data were collected retrospectively from January 1, 2015 to December 31, 2018 and were based on consultation, hospitalization and clinical records. Our study population consisted of patients with hypothyroidism who were managed in one of the above-mentioned teaching hospitals between January 1, 2015 and December 31, 2018. Our target population included all patients who visited or were hospitalized for dysthyroidism in any of the above-mentioned facilities during the study period. We used a comprehensive census as our sampling me-

thod. Included in our study were all patients who consulted or were hospitalized in one of the above-mentioned facilities during the study period for confirmed hypothyroidism. Patients seen for hypothyroidism between January 1, 2015, and December 31, 2018, whose clinical records were unexploitable, incomplete, or nonexistent were not included in our study.

The variables studied were sociodemographic (age, sex, place of residence and socio-professional activity), clinical history (thyroid pathology, goiter, hyperthyroidism, thyroidectomy, diabetes and hypertension) and clinical manifestations (facial puffiness, weight gain, paresthesias, asthenia, lethargy, bradycardia, constipation, chills, depilation, myalgia and voice raucity).

Biological data included baseline hormones assays (T4L, T3L and TSH-us levels), thyroid autoantibody assays and hematological workup. Morphological data included thyroid ultrasound findings (size, echogenicity, shape). The main etiologies were investigated (Hashimoto's thyroiditis, atrophic thyroiditis, drug-induced causes (synthetic antithyroid drugs), surgery (total thyroidectomy, subtotal thyroidectomy), thyrotropic insufficiency). Therapeutic and evolutionary variables were related to the start of treatment, the dose of drug used, the duration of treatment, the outcome under treatment (euthyroidism, hypothyroidism, hyperthyroidism).

An individual data collection form was used to collect data with the prior agreement of the heads of the different facilities and departments involved in the study. For confidentiality reasons, only the number of the data collection form was mentioned during data analysis. The information collected was kept confidential and anonymous.

The data collected was entered on a microcomputer and analyzed using Epi Info software version 7.2.1.0. Graphs and tables were produced using Microsoft Excel and Word 2016 software.

3. Results

General characteristics of the population

A total of 413 cases of dysthyroidism were collected in the internal medicine departments of three teaching hospitals in the city of Ouagadougou between January 1, 2015 and December 31, 2018. Of these 413 cases, 120 were related to hypothyroidism, representing 29.05% of all dysthyroidism cases. This corresponds to an average of 30.05 cases of hypothyroidism per year. Hypothyroidism was primary in 119 (99.2%) patients and secondary in one (0.8%) patient. The age group of 30 to 50 years was the most represented (47.5%). The extremes of age were 10 and 80 years with a mean age of 45.7 ± 14.7 years and a sex ratio of 0.26. One hundred and eleven (92.5%) resided in urban areas. Housewives accounted for 35.8% of cases, followed by civil servants who accounted for 24.2%.

Table 1 below shows general characteristics of the Study Population.

Characteristics of hypothyroidism

Table 2 below summarizes the distribution of patients according to the frequency of the different manifestations of hypothyroidism.

Table 1. General characteristics of the study population (N = 120).

	Number (n)	Percentage (%)
Health facility		
Yalgado Ouédraogo Teaching Hospital	105	87.5
Tengandogo Teaching Hospital	10	8.3
Bogodogo Teaching Hospital	5	4.2
Sex		
Male	25	20.8
Female	95	79.2
Age (years)		
[10 – 30]	14	11.7
[30 – 50]	57	47.5
[50 – 70]	44	36.7
[70 – 90]	5	4.1
Place of residence		
Urban	111	92.5
Rural	9	7.5
Socio-professional activity		
Housewives	43	35.8
Civil servants	29	24.2
Students	13	10.8
Traders	8	6.7
Farmers	5	4.2
Retired	8	6.7
Other*	14	11.6
History of thyroid pathology		
Thyroid pathology	106	88.3
Goiter	64	53.3
Hyperthyroidism	75	62.5
Thyroidectomy	40	33.3
Comorbidities		
HPT	30	25
Diabetes	10	8.3
Cardiopathy**	6	5

*Other: traditional practitioner, painter, welder, hairdresser; ** Cardiopathies: Dilated cardiomyopathies, Hypertensive cardiomyopathies, Heart failure, Valvulopathies.

Table 2. Distribution of patients according to the frequency of the different characteristics of hypothyroidism.

	Number (n)	Percentage (%)
Clinical signs		
Weight gain	34	28.3
Asthenia	19	15.8
Myalgia	18	15
Constipation	10	8.3
Paresthesia	7	5.8
Lethargy	5	4.2
Bradycardia	3	2.5
Frilosity	2	1.7
Puffiness of the face	2	1.7
Depilation	1	0.8
Hoarseness of voice	1	0.8
<i>Subtotal</i>	120	100
Ultrasound data		
Presence of goiter	44	70.96
Anodular	28	45.16
Multinodular	12	19.35
Uninodular	4	6.45
Absence of goitre	18	29.04
Uninodular	4	6.45
Multinodular	14	22.59
<i>Subtotal</i>	62	100
Etiologies		
Hypothyroidism secondary to the administration of synthetic antithyroid drugs.	54	45
Thyroid surgery	39	32.5
Hashimoto's thyroiditis	11	9.2
Atrophic thyroiditis	1	0.8
Central hypothyroidism	1	0.8
Unspecified	14	11.7
<i>Subtotal</i>	120	100
Evolution under treatment		
Euthyroidism	80	66.7
Hyperthyroidism	12	10
Hypothyroidism	28	23.3
<i>Subtotal</i>	120	100

Clinical characteristics of hypothyroidism

One hundred and six patients (88.3%) had a history of thyroid disease. A proportion of 53.3% of patients had a goiter, 62.5% had hyperthyroidism and 33.3% had undergone thyroidectomy. Thirty patients (25%) of the cases in our series had associated hypertension. Out of the 120 cases collected, 34 patients (28.3%) had an unquantified weight gain and 19 patients (15.8%) had asthenia. Eighteen (18) patients (15%) and 7 patients (5.8%) had myalgia and paresthesia respectively. Constipation was reported in 10 patients, corresponding to 8.3% of cases.

Paraclinical features of hypothyroidism

TSHus was elevated in 99.2% of patients in our series. It ranged from 4 to 10 mIU/L in 21.7% of cases, from 10 to 50 mIU/L in 59.2% of cases and higher than 50 mIU/L in 18.3% of patients. One patient (0.8%) had a TSHus level as low as 0.3 mIU/L.

The T3L assay was performed in 22 of our patients (18.3%). Its level was lowered in 40.9%. The average was 2.2 ± 1.5 pg/ml. T4L was measured in 66 of our patients (55.0%). Its level was lowered in 68.2%. The average was 6.6 ± 4 pg/ml.

Anti-TPO antibodies were assayed in 13 of our patients (10.83%). Ten of them tested positive with an average antibody level of 694 IU/L.

A blood count was available in 24 patients and anemia was detected in 50% of them. This anemia was moderate in 11 (91.7%) patients with hemoglobin levels between 8.8 and 10.8 g/dl and severe in one (8.3%) patient with hemoglobin levels of 7.4 g/dl. It was normocytic in half of the cases and microcytic in the other half.

A cervical ultrasound was performed in 62 patients (51.67%). Ultrasound results showed a goiter in 44 cases (70.96%).

Etiologies of hypothyroidism

Of the total of 120 cases of hypothyroidism included in our study, 119 (99.2%) were of peripheral origin including 93 cases (78.15%) of iatrogenic hypothyroidism.

Therapeutic and evolutionary data

The treatment of hypothyroidism involved the prescription of Levothyroxine sodium in 71 patients (59.2%), reduction of synthetic antithyroid drugs' doses in 42 patients (35%) previously treated for hyperthyroidism. Seven patients (5.83%) were withdrawn from therapy with clinical and biological monitoring.

Patients who received hormone supplementation were treated with levothyroxine sodium at doses ranging from 5 to 200 µg/day, representing an average dose of 84.5 ± 38.7 µg/day. The mean duration of treatment was 21.9 ± 32.5 months. Good hormonal balance was achieved in 59.2% of patients. However, hypothyroidism was persistent in 33.3% of patients.

4. Discussion

Overall results

Over the four years, we collected 120 cases of hypothyroidism in the three in-

ternal medicine departments of the city of Ouagadougou, *i.e.* about 30.05 cases per year.

This frequency of 30.05 cases per year found in our study would be the tip of the iceberg due to numerous obstacles to access to care such as the low socio-economic level hindering the performance of diagnostic tests, the use of traditional medicine, the poor and inaccessible technical equipment, as well as the lack of specialized human resources, both internists and endocrinologists.

Socio-demographic characteristics

In our series, we found 79.2% of women with hypothyroidism. Indeed, hypothyroidism is a predominantly female endocrinopathy. Our results are in line with those of the African series [10] [11] [12].

The mean age of patients at diagnosis was 45.7 years in our study. Brah *et al.* in Niamey, and Djrolo *et al.* in Benin had similar mean ages of 42.27 years [5] and 45.7 years [10] respectively. In the literature, hypothyroidism is observed at any age. However, its incidence remains higher between the fourth and fifth decade of life, with the mean age at its onset most often in this range [10].

The majority of our study population was composed of housewives, who represented 35.8% of cases, followed by civil servants, who represented 24.2% of cases, and traders, who represented 6.7% of the cases in our series. In Sissoko's series in Mali, housewives were also in the majority with 63.64% of cases, followed by civil servants with 18.18% and traders with 9.09% [13]. A study conducted in Niger also reported a majority of housewives (64.8%) and civil servants (16.66%) [11]. The preponderance of women in the different studies could be explained by the fact that women attend health facilities more often than men [14].

Pathologies associated with hypothyroidism

Hypertension was found in 25% of our patients and diabetes in 8.3%. Our results are lower than those of Abid *et al.* in Tunis, who found 52% for hypertension and 38.6% for diabetes [15].

Hypothyroidism leads to contraction of smooth muscle cells in the vessels, increasing peripheral vascular resistance, resulting in hypertension, especially diastolic hypertension, which occurs in some hypothyroidism cases even though cardiac output is decreased. Similarly, a positive correlation between hypothyroidism and insulin resistance is well known.

The frequency of these pathologies in the Burkinabe population could also explain the rates found in our study.

Clinical features of hypothyroidism

In our study, 15.8% of patients had asthenia. Much higher rates of patients with asthenia were reported in two studies conducted in Niamey with 61.1% [11] and in Rabat with 83.3% [12]. Asthenia is a general, non-specific symptom frequently encountered in hypothyroidism.

Weight gain was found in 28.3% of our patients. This proportion was lower than those found in other studies in Benin, Niger and Morocco respectively 45% [10], 51.9% [11] and 40% [12].

Muscular signs of myalgia were found in 15% of cases in our study. These results were in agreement with those found in Benin (15%) [10] and Niger (16.7%) [11].

Only 1.7% of the patients in our series were found to suffer from frilosity. This proportion was lower than the one found by Semlali in Rabat, where 43.3% of patients complained of frilosity [12].

Puffiness of the face was also found in 1.7% of patients in our study. Djrolo *et al.* found 45% of patients with facial puffiness in their series in Cotonou [10].

Constipation was found in 8.3% of our patients. This frequency was lower than those of Mahamane Sani *et al.* in Niger and Semlali in Morocco, who reported 48.1% [11] and 53.3% [12], respectively. However, it was in line with the frequency reported by Djrolo *et al.* in Benin, who found constipation in 12% of cases [10].

In our series we observed 2.5% of patients with bradycardia. This rate is low compared with those in other studies, which found 24% [10] and 33.3% [12].

Lethargy was found in 4.2% of the cases in our series. Other authors reported much higher rates of 27.30% [5] and 30% [10].

The under-reporting of clinical signs in medical records, or consultation and/or hospitalization registers could explain the underestimation of the frequency of clinical signs in our study.

Paraclinical features of hypothyroidism

Among the primary hypothyroidism cases, 18.3% of patients with TSHus levels higher than 50 mIU/L revealing late detection, 59.2% had TSHus levels ranging from 10 to 50 mIU/L and 21.7% had TSHus levels between 4 mIU/L and 10 mIU/L.

Our results differed from those of Semlali, who found 26.66%, 40% and 20% of patients with TSHus higher than 50 mIU/L, 10 - 50 mIU/L and 4 - 10 mIU/L, respectively [12].

T3L was measured in only 22 patients. It was lowered in 40.9% of them with an average of 2.2 ± 1.5 pg/ml. In the Semlali series in Morocco, T3L was measured in 21 patients and was lowered in 85.7% of them [12]. Mahamane Sani found a mean level of 2 ± 0.8 pmol/l in Niamey [11].

The mean T4L level in our study was 6.6 ± 4 pg/ml, which was close to that found by Mahamane Sani. (6.9 ± 6 pmol/l) [11]. The T4L level was normal in 31.8% of our cases, higher than that found by Mahamane Sani [11].

The T4L level was normal in 31.8% of our cases, higher than the level in Semlali's study that found 16.67% of patients with a normal T4L level [12].

In our series, anemia was found in 50% of the patients in whom a blood count was performed. Our rate is close to that of Semlali in Morocco, who found 40% of patients with hypothyroidism and anemia [12]; but is higher than that of Mahamane Sani who found 7.4% of patients with anemia in their series in Niamey [11]. Hypothyroidism is often accompanied by anemia, which can be a circumstance of discovery, due to reduced peripheral oxygen requirements and thus reduced erythropoietin secretion.

The existence of intercurrent parasitic diseases such as malaria in our country could explain the high rate of anemia found in our series, and thus be a confounding factor.

Classification of hypothyroidism

Hypothyroidism was rough in 16.8% of our patients. The frequency in our study was lower than that of Abid *et al.* who found 36% of patients with rough hypothyroidism in their Tunis series [15].

Our study found a predominance of hypothyroidism of peripheral origin (99.2%). Our results were similar to those found in the African series with 82% in Niger [11] and 86.7% in Morocco [12].

Etiologies of hypothyroidism

Hypothyroidism induced by synthetic antithyroid drugs was reported in 45% of our patients. It was the most common etiology in our series. Our results were higher than those of Mahamane Sani *et al.* who found only 18.5% hypothyroidism secondary to synthetic antithyroid drugs [11].

Surgical etiology (thyroidectomy) was second with 32.5% of the cases in our series. Several African studies have found a higher proportion of thyroidectomy in their etiologies. Thyroidectomy was involved in 70%, 51.9%, and 64.4% of cases in Cotonou [10], Niamey [11], and Brazzaville [6], respectively. In Morocco, Semlali reported a lower rate in his series, 13.33% [12].

The analysis of our cases of primary hypothyroidism does not find, as reported in the literature, a high proportion of autoimmune etiology.

Indeed, Hashimoto's thyroiditis was the third cause of hypothyroidism found in our study (9.2%). It was predominantly female (90.9%). The anti-TPO antibody levels were very high with an average level of 694 IU/L. Our results differed from those of Boufaïda in Fez, where Hashimoto's thyroiditis was the second most common cause of hypothyroidism after thyroidectomy, with an average level of anti-TPO antibodies of around 200 IU/L [16]. A female predominance (95%) was also found [16]. However, our results are in agreement with those of two studies carried out in Cotonou and Niamey, which respectively found 7.4% [10] and 16.6% [11] of Hashimoto's thyroiditis as etiologies [16]. It could be said that Hashimoto's thyroiditis is relatively rare in hospitals in Ouagadougou, but this apparent scarcity can be explained by the fact that it is poorly investigated due to the inaccessibility of anti-thyroid antibody assays.

Central hypothyroidism was reported in only 0.8% of cases in our series. This rate was consistent with the literature which states that thyroid insufficiency accounts for less than 5% of hypothyroidism [10]. Nevertheless, our prevalence was lower than that found by other African authors in Cotonou (12%) [10] and Rabat (13.3%) [12].

Therapeutic and evolutionary data

Only 71 of the patients (59.2%) included in our study had been treated with levothyroxine sodium at doses ranging from 5 to 200 µg/day for a mean dose of 84.5 ± 38.7 µg/day. This could be explained by the fact that many patients who

experienced synthetic antithyroidism induced by synthetic antithyroid drugs intake during their hyperthyroidism follow-up only had their synthetic antithyroid drug dose reduced or discontinued with clinical and biological monitoring.

5. Limitations

Our study was faced with limitations and biases that need to be taken into account in the interpretation of the results. These limitations and biases were related not only to the qualitative inadequacies of the medical records, consultation and hospitalization registers but also to the framework of the study. Indeed, the fact that our patients were recruited only in teaching hospitals and only in internal medicine departments could be at the origin of a selection bias making the generalization of our results difficult.

6. Conclusion

Hypothyroidism was common in women after the age of 40 with an incidence of 30.05 cases per year. Clinical symptoms were poor. However, there was clinical polymorphism, reflecting the ubiquitous action of thyroid hormones. Iatrogenic forms were the most common etiologies. In the light of the limitations of our study, it seems necessary to consider other studies with a more multicentric scope with the creation of a dysthyroidism record to collect better data on hypothyroidism in Burkina Faso.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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Appendix

COLLECTION FORM

Data sheet number:

Study Center:

File number:

1. Socio-demographic data

o Age (years):

o Sex: M F

o Place of residence: Urban Rural

o Socio-professional activity: Civil servant Housewife

Student Shopkeeper Farmer Retired Unemployed Other Not specified

o Marital status: Single Married Divorced

Widowed

2. Clinical data

2.1. Date of discovery of hypothyroidism:

2.2. Personal and family history

o Personal history of thyroid disease: Yes No Not specified

If yes, specify: Goiter Hyperthyroidism Thyroid surgery

Date discovered:

o Other personal history

Drug use: Yes No Not specified

If yes, specify: Thyroid hormones: Yes No

Synthetic antithyroid drugs: Yes No Iodine: Yes No

Lithium: Yes No Other:

Pathological: Diabetes Hypertension Asthma Other:

2.3. Clinical manifestations:

o Circumstances of discovery:

Goiter Clinical signs of hypothyroidism Post-thyroidectomy

Follow-up to hyperthyroidism treatment Incidental Other:

o Clinical signs of hypothyroidism:

Weight gain: Yes No Lethargy: Yes No

Asthenia: Yes No Paresthesias: Yes No

Facial puffiness: Yes No Bradycardia: Yes No

Constipation: Yes No Coldness: Yes No

Hair Loss / Depilation: Yes No Myalgia: Yes No

Hoarseness of Voice: Yes No

3. Paraclinical data

3.1. Biology

o Hormone levels

T4L: T3L: TSHus:

o Antithyroid antibodies

Anti-TPO antibodies:

o Other biological tests

CBC: Hemoglobin level: VGM:

3.2. Thyroid ultrasound

Goiter: Yes No Nodules: Yes No

If yes: Single Multiple

Echogenicity: Hypoechoic Isoechoic Hyperechoic

Shape:

4. Etiological data

Hashimoto's thyroiditis Atrophic thyroiditis

Postpartum thyroiditis

Drug causes: - Iodine - Lithium - Synthetic antithyroid drugs

Surgery: - Total thyroid surgery - Subtotal thyroid surgery

Thyroid insufficiency

Other (specify):

5. Therapeutic and evolutionary data

5.1. Daily doses of L Thyroxine

5.2. Current clinical status: Hypothyroidism Euthyroidism

Hyperthyroidism