

## Diabetes &amp; its Complications

## Dyslipidemia in Patients with Hypothyroidism at the Abass Ndao Hospital in Dakar

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**ABSTRACT**

**Introduction:** Hypothyroidism can lead to lipid abnormalities. Work on this entity remains limited in Africa. The aim was to describe the characteristics of dyslipidemia in hypothyroid patients at the Clinique Médicale II of the Centre Hospitalier Abass Ndao in Dakar.

**Patients and methods:** This was a cross-sectional, descriptive and analytical study conducted from January 01, 2011 to April 30, 2023, a period of 13 years. It focused on patients with hypothyroidism. Epidemiological data and dyslipidemia characteristics were evaluated.

**Results:** We enrolled 52 patients. The incidence of dyslipidemia was 75%, with 38 women (97.43%), giving a sex ratio (m/f) of 0.02. The mean age was 47.46 years, with extremes of 22 and 69 years. The average consultation time was 2.24 years. Dyslipidemia was more marked in the [40-49] age group, with 17 cases (73.9%). Clinical signs were dominated by asthenia in 14 patients (35.89%), weight gain in 5 (12.82%) and constipation in 18 (46.15%). Mean systolic blood pressure was 12.79 mmhg, with extremes ranging from 9 to 17 mmhg. The mean LDL cholesterol level was 1.60 g/l with extremes ranging from 0.19 to 4.09g/l. It was higher in dyslipidemics than in non-dyslipidemics ( $p < 0.001$ ). Hypercholesterolemia alone concerned 30 cases (76.9%). Mixed dyslipidemia (hypercholesterolemia + hypertriglyceridemia) concerned 4 cases (10.3%). Atherogenic dyslipidemia (hypertriglyceridemia and low HDL) concerned one case (2.6%). In terms of etiology, Hashimoto's thyroiditis was more prevalent in 26 patients (66.6%), and euthyroidism at 9 months was noted in 65.7% of dyslipidemic patients than in 34.3% of non-dyslipidemic patients ( $p=0.025$ ).

**Conclusion:** Dyslipidemia remains high in hypothyroidism, especially in women and elderly subjects. Hormone replacement therapy improves dyslipidemia.

**Keywords**

Hypothyroidism, Profile, Dyslipidemia, Senegal.

**Introduction**

Hypothyroidism is defined as an elevated TSH concentration in the presence of lower serum free thyroxine (FT4) and free triiodothyronine (FT3) [1]. Hypothyroidism is common; however, prevalence estimates vary depending on the population studied,

with a worldwide prevalence of around 7.5-8.5% in women and 2.8-4.4% in men [2]. Hypothyroidism may be responsible for lipid abnormalities, increasing the risk of cardiovascular disease and even morbidity and mortality. To our knowledge, no study has yet been carried out in our practice setting. This motivated us to carry out this study, the aim of which was to analyze the lipid profile in patients with primary hypothyroidism at the Abass-Ndao Hospital.

## Materials and Methods

The study was carried out at the Clinique Médicale II of the Abass Ndao Hospital in Dakar.

### - Type and period of study

This is a retrospective descriptive study of the records of patients followed for spontaneous primary hypothyroidism in adults over a 13-year period (January 2011 to April 2023).

### - Study population

The study population consisted of patients followed up for primary hypothyroidism at the endocrinology consultation that had performed a lipid panel.

### - Inclusion criteria

Patients known to have spontaneous primary hypothyroidism in adults during the study period and who had undergone a lipid panel.

**Collection tools:** A form was drawn up to serve as a basis for data collection.

**Sources of data:** data were collected on a form from the files of patients fulfilling the inclusion criteria.

Total cholesterol, LDL-cholesterol, HDL-cholesterol and triglycerides were measured. Lipid balance abnormalities occur

when:

- Total cholesterol > 2g/l.
- Triglycerides > 1.5g/l.
- HDL-cholesterol < 0.35g/l.
- Mixed dyslipidemia was defined as two or three lipid abnormalities.

Euthyroidism was defined as a serum TSH between 0.40 and 4 mIU/L. Overt hypothyroidism was defined as thyroid stimulating hormone (TSH) above the normal reference range and free thyroxine (FT4) below the lower limit of the normal reference. Range (reference range 10-23 pmol/L).

### Data capture and analysis

Data were entered into Microsoft Office Excel and analyzed using epi info 2000 version 3.3.2.

## Results

During the study period, 52 patients were enrolled. The incidence of dyslipidemia was 75%, with 38 women (97.43%), giving a sex ratio (m/f) of 0.02. The mean age was 47.46 years, with extremes of 22 and 69 years. The average consultation time was 2.24 years (Table 1). Dyslipidemia was more marked in the [40-49] age group, with 17 cases (73.9%); in patients under 30 years of age, it accounted for 80% of cases, and in subjects over 60, 100% (Table 2). The majority of patients came from the Dakar region

Parameters	Dyslipidemia				P
	Yes		No		
	Average	Standard deviation	Average	Standard deviation	
Age	47,46	11,64	46,15	8,93	0,713
Consultation period	2,24	2,31	2,51	1,97	0,711
Pulse	76,33	14,33	75,77	14,25	0,903
TAS	13,00	2,26	12,15	1,82	0,227
TAD	7,85	1,33	7,62	0,96	0,567
Weight (Kg)	73,09	15,03	71,23	20,01	0,725
Sizes (cm)	1,67	0,06	1,60	0,08	0,027
BMI	26,54	5,09	29,20	9,26	0,358
Hemoglobin	11,77	1,50	11,83	1,33	0,918
VGM	86,09	7,98	84,60	6,21	0,642
Calcemia	92,03	9,06	91,33	1,15	0,901
Chol Total	2,78	1,47	1,71	0,18	0,012
HDL	0,58	0,18	0,56	0,13	0,717
LDL	1,79	0,68	1,01	0,15	0,000
Triglyc	1,07	0,57	0,81	0,30	0,140
TSH (µUI/ml)	39,23	32,88	29,43	27,16	0,338
T4L (µmol/L)	8,56	8,65	8,28	3,94	0,911
Anti AntiTPO	662,38	553,02	551,38	280,15	0,492
Blood glucose (g/l)	1,02	0,29	1,08	0,36	0,550
TSHM1	36,88	40,50	7,87	5,54	0,206
TSHM4	16,20	17,91	15,42	40,01	0,944
T4M4	12,11	3,92	10,46	7,47	0,725
TSHM9	5,05	7,53	1,61	1,13	0,184
T4M9	13,71	4,55	17,39	4,06	0,024

**Table 1 :** Distribution of patients according to clinical and evolutionary socio-demographic characteristics.

(n=37, 71%). Clinical signs were dominated by asthenia in 14 patients (35.89%), weight gain in 5 cases (12.82%), constipation in 18 cases (46.15%) and chilbleness in 4 patients. Mean systolic blood pressure was 12.79 mmhg, with extremes ranging from 9 to 17 mmhg. Mean diastolic blood pressure was 7.79 mmhg with extremes ranging from (4 to 11mmhg). mean BMI was 26.97kg/m<sup>2</sup>. Mean total cholesterol level was 2.52g/l, with extremes ranging from 1.30 to 9.04g/l. The mean HDL cholesterol level was 0.57g/l, with extremes ranging from 0.15 to 0.99g/l. The mean LDL cholesterol level was 1.60 g/l, ranging from 0.19 to 4.09 g/l.

Age range		Dyslipidemia		Total	P
		Yes	No		
< 30	Workforce	4	1	5	0,633
	%	80,0%	20,0%	100,0%	
30 - 39	Workforce	3	1	4	0,696
	%	75,0%	25,0%	100,0%	
40 - 49	Workforce	17	6	23	0,872
	%	73,9%	26,1%	100,0%	
50 - 59	Workforce	8	5	13	0,176
	%	61,5%	38,5%	100,0%	
60+	Workforce	7	0	7	0,115
	%	100,0%	,0%	100,0%	

**Table 2:** Patient distribution by age group.

It was higher than in non-dyslipidemic subjects (p 0.001). The mean triglyceride level was 1.00 g/l, with extremes ranging from 0.39 to 2.80 g/l. Hypercholesterolemia alone concerned 30 cases (76.9%). Mixed dyslipidemia (hypercholesterolemia +hypertriglyceridemia) concerned 4 cases (10.3%). Atherogenic dyslipidemia (hypertriglyceridemia and low HDL) concerned one case (2.6%). Dyslipidemia associating hypercholesterolemia, hypertriglyceridemia and low HDL was also noted in one case (2.6%) (Table 3). In terms of etiology, Hashimoto's thyroiditis was more prevalent in 26 patients (66.6%) (Table 4), and euthyroidism was noted at 9 months in dyslipidemic patients (65.7%) than in non-dyslipidemic patients (34.3%) (p=0.025).

Profile of Dyslipidemia	Workforce (n=39)	Percentage (%)
Hypercholesterolemia	30	76,9
High cholesterol +Tr	4	10,3
Low HDL	2	5,1
Hypercholesterolemia + hypertriglyceridemia + low HDL	1	2,6
Hypercholesterolemia + low HDL	1	2,6
hypertriglyceridemia + low HDL	1	2,6
Total	39	100

**Table 3:** Distribution of patients by dyslipidemia profile.

Etiologies		Dyslipidemia		Total	P
		Yes	No		
Hashitoxicosis	Workforce	1	0	1	0,75
	%	100,0%	,0%	100,0%	
Chronicatrophic thyroiditis	Workforce	11	1	12	0,125
	%	91,7%	8,3%	100,0%	
Hashimoto's thyroiditis	Workforce	26	12	38	0,068
	%	68,4%	31,6%	100,0%	
Postpartum thyroiditis	Workforce	1	0	1	0,75
	%	100,0%	,0%	100,0%	

**Table 4:** Distribution of patients by etiology.

## Discussion

### Epidemiological aspects

Lipid abnormalities in patients with overt hypothyroidism have been well described. The frequency of dyslipidemia in our study was 75%, which, although high, remains lower than existing data worldwide. Frequencies of 85% and 91.78% of have been reported respectively by Rekha M.C et al [3] and Hsai F.E in Morocco [4]. These results concur with those of previous studies which reported a high prevalence of dyslipidemia in hypothyroidism [5,6]. A Mayo Clinic study noted a 90% prevalence of overt hypothyroidism [7]. Brett S. Mansfield in South Africa found a dyslipidemia frequency of 70.56% [8].The frequency of dyslipidemia seems to vary according to the recruiting department and sample size. Hypothyroidism affects around 2% of the population and is more frequent in women than in men [9].The predominance of the female sex was confirmed in our study. Only one man was noted. The mean age was 47.46 years. Swamy K M found a mean age of 40.4 ± 10.4 years [10].

In our study, hypercholesterolemia alone affected 76.9% of patients, while mixed dyslipidemia (hypercholesterolemia +hypertriglyceridemia) affected 10.3%. In Morocco, the prevalence of hypoHDLemia, hypercholesterolemia, hypertriglyceridemia and hyperLDLemia were 82.12%, 32.5%, 23.32% and 10.8% respectively [4].

Atherogenic dyslipidemia in our study concerned one case (2.6%). It has been shown that results in studies concerning TG and HDL-C are more varied than the more consistent results for TC and LDL-C. In cases of atherogenic dyslipidemia, an increase in coronary heart disease (CHD) and CHD mortality has also been reported [11]. The mean LDL cholesterol level was 1.60 g/l. Both overt and subclinical hypothyroidism play an important role in LDL levels.an increase in LDL-C levels in patients with subclinical or overt hypothyroidism may promote the formation of oxidized LDL [12], which in turn may play a role in the development of atherosclerosis and coronary heart disease [13] in the literature, dyslipidemia appears to be age-related.

Previous studies have reported an age-related increase in total cholesterol, LDL cholesterol and a decrease in HDL cholesterol [14,15]. These findings are consistent with our study. In

patients over 60, dyslipidemia was present in 100% of cases, and euthyroidism after levothyroxine treatment was noted in dyslipidemic patients (65.7%) compared with non-dyslipidemic patients (34.3%) ( $p=0.025$ ). In one study, levothyroxine treatment normalized TSH [7], accompanied by a significant fall in TC, LDL-C, TG and HDL.

### Conclusion

Dyslipidemia remains high in primary hypothyroidism, and is particularly marked in women and elderly subjects. Hormone replacement therapy is necessary to improve dyslipidemia.

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