

# Lipid Profile among the Diabetic and Non-Diabetic Obese Patients

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## Abstract

**Objective:** To study the lipid profile among the diabetic and non-diabetic obese patients. **Methods:** It was a descriptive and prospective study carried out over a period of 9 months from March to December 2010. It concerned all the patients who came for consultation in endocrinology at the internal medicine of Point G University Hospital Center and at the National Center for Diabetes Research. All the patients were included without any gender or age difference, voluntary and with a BMI  $\geq 30$  kg/m<sup>2</sup>. **Results:** Out of the 1543 patients received in consultation, we had identified 178 obese people that is to say 11, 53% of the cases. Among these cases 60 abided by our criteria with 30 diabetic patients and 30 non-diabetic ones. The average age was  $45.83 \pm 14.68$  years old; 73.3% were more than 40 years old. The sex ratio was 0.07. Two third (66.7%) of our patients limited their eating diet to the three main meals/day and 61.7% were sedentary. The notion of family obesity was found in 93.4% of the cases, of family diabetes in 58.3% of the cases, of past personal medical history of hypertension in 43.3% of the cases. It was about an android obesity in 91% and Gynoid in 9% of the cases. The BMI was 55% of the cases comprised between 30 - 34.9 kg/m<sup>2</sup>. The lipid profile noticed was: A hypertriglyceridemia: 33% of diabetic patients and 10% of non-diabetic patients, a high LDL cholesterol: 37% of diabetic patients and 30% of our diabetic patients, a HDL hypocholesterolemia: 40% of the diabetic patients and 20% of the non-diabetic patients, a total hypercholesterolemia: 37% of the diabetic patients and 23% of non-diabetic patients. A hyperglycemia was noticed in

13.3% of non-diabetic patients. **Conclusion:** The frequency of metabolic troubles were higher in obese diabetic patients compared to non-diabetic obese patients mainly the hypertriglyceridemia.

## Keywords

Diabetes, Obesity, Dyslipidemia

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## 1. Introduction

Obesity is a chronic disease which corresponds to an excess of fat having some dangerous consequences on people's health.

The factors causing the development of obesity are multiple and intricate: Caloric density of the eating diet, sedentary lifestyle, psychological factors, role of heredity, socio-economic context [1]. Its definition is based on the calculation of the body mass index ( $BMI = \text{weight} / \text{height}^2$ : Weight in kg and height in  $m^2$ ). A  $BMI \geq 30 \text{ kg/m}^2$  defines obesity in the cases of both sexes for the adult [2].

Obesity is frequent; it concerns 12.4% of the adult population in France, that is to say around 6 millions of people; 0.8% of the population presents a mass obesity ( $BMI \geq 40 \text{ kg/m}^2$ ). In Mali 20.4% of patients ageing between 18 - 35 years are obese in cardiology [3], and 26.7% of patients ageing between 18 - 85 years are obese in the diabetic population [4].

Lipid troubles are very frequent among the diabetic patients of type 2. The high rate of cholesterol and de triglyceride are known for long time as a high risk factor for cardiovascular diseases [5].

The presence of a dyslipidemia on a diabetic terrain is a factor of supplementary risk [5].

The overall goal was study To study the lipid profile among the diabetic and non-diabetic obese patients.

## 2. Methodology

Area of the study: the study was carried out at the Service of Internal Medicine of University Hospital Center point G and at the National Center for Diabetes Research.

Type and period of the study: It was a transversal and analytical study implemented over a period of 9 months going from March 2010 to December 2010.

Study Population: It was made of the entire number of patients who came for endocrinology consultation at the internal medicine service of University Hospital Center point G, or at the National Center for Diabetes Research. Two groups were targeted: 30 diabetic patients and 30 non-diabetic patients.

Sampling: the sample concerned all the patients consulted during the period of the study.

Inclusion Criteria: Any patient from both sexes, without any age limitation,

volunteer and having a body mass index (BMI) higher or equal to 30 kg/m<sup>2</sup>.

Criteria of Non-inclusion: Patients having a BMI inferior to 30 kg/m<sup>2</sup>, those refusing to accept the protocol, those consulted after the period of the study and those having not benefited from complementary examinations.

### Studied Variables

Clinic Variables: The calculation of the BMI in consistence with weight and height following the formula of Quetelet: BMI = Weight (kg)/(Height in m<sup>2</sup>).

Three types are defined: BMI between 30 and 34.9 = moderated obesity; BMI between 35 and 39.9 = severe obesity; BMI ≥ 40 = morbid obesity.

The measure of the height (TT): we have used the criteria of the International Federation of Diabetes [2], with man: normal if ≤ 94 cm. if > 94 cm, abdominal obesity; with woman: normal if ≤ 80 cm; if > 80 cm, abdominal obesity.

The calculation of the relation of the height/the size of hip: we have used the criteria of the International Federation of Diabetes. With man: normal Value if the relation of the height/the size of hip ≤ 1; if > 1 android obesity. With woman: normal value if the relation of the height/the size of hip ≥ 0.85 if < 0.85 gynoid obesity.

Para-clinic Variables: Glycaemia: normal if comprises between 0.79 - 1.10 g/l that is to say (4.1 - 6.1 mmol/l).

Uricaemia: normal if comprises between 200 - 400 µmol/l that is to say (33 - 70 mg/l).

HDL cholesterolemia: normal if > at 0.40 g/l that is to say (1.20 - 1.70 mmol/l).

LDL cholesterolemia: normal if < at 1.60 g/l that is to say (<3.50 mmol/l).

Triglyceridemia: normal if comprises between 0.50 - 1.5 g/l that is to say (0.70 - 1.70 mmol/l).

Total Cholesterolemia: normal if comprises between 1.5 - 2.20 g/l that is to say (3.88 - 5.68 mmol/l).

HbA1c: inferior or equal to 7%.

Data Analysis: The processing and analysis of the data were done through the softwares SPSS version 10.0 and Microsoft Word Office 2007. We have retained  $p < 0.05$  as the point of signification for statistical tests.

### 3. Results

Out of a total of 1543 patients in consultation during the period of the study, we identified 178 obese patients among whom 60 abided by our criteria of inclusion with 30 diabetic patients and -30 non-diabetic patients. The average age was  $45.83 \pm 14.68$  years old, among whom 73.3% were older than 40. The sex ratio was 0.07 in each group. The household keepers represented 51.7% of our series. Sixty six point seven percent (66.7%) of our patients were limiting their eating diet to the three main meals/day. Sixty one point seven percent (61.7%) of our patients were sedentary. The past family medical history of obesity and diabetes was respectively found in 93.4% and 58.3% of the cases. Forty three point three

percent (43.3%) of our patients were known hypertensive ones.

Thirty percent (30%) of our patients have consulted for diabetes and 18.7% for obesity (as shown in **Table 1**).

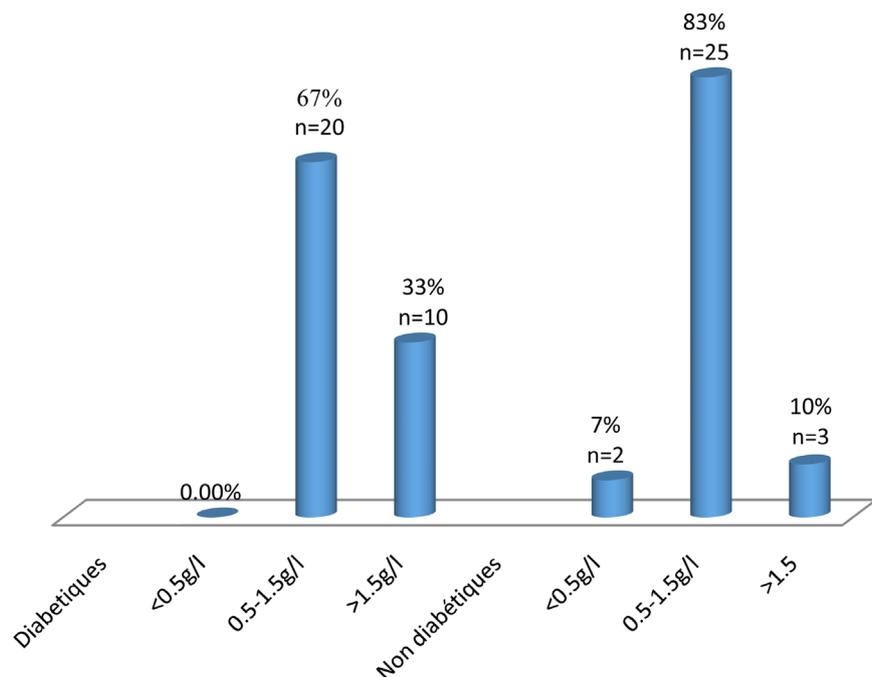
Android obesity was present in 100% and 91% among women. Hypertriglyceridemia was present in 33% of the diabetic patients and 10% among non-diabetic patients (as shown in **Figure 1**).

A high LDL cholesterol was present in 37% of the diabetic patients and 30% among non-diabetic patients (as shown in **Figure 2**).

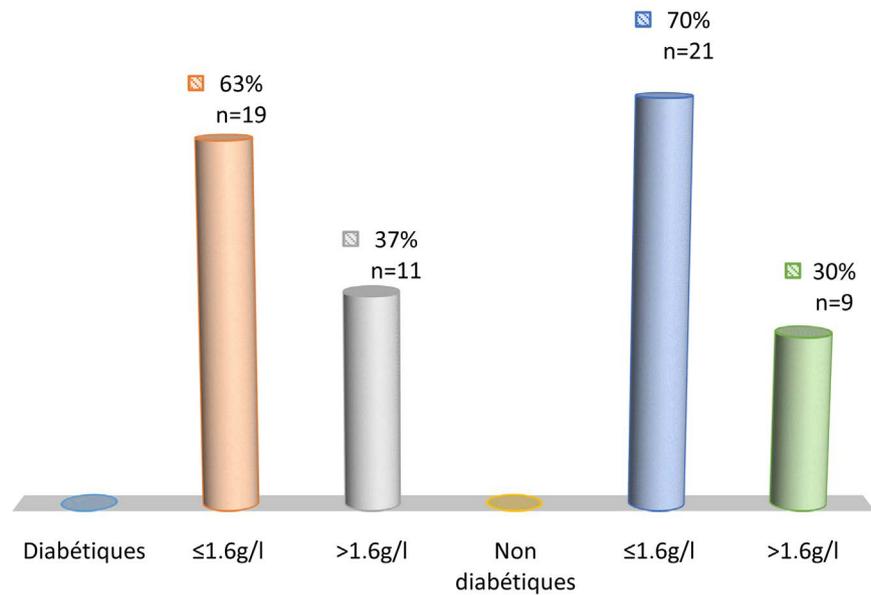
A HDL hypocholesterolemia was found in 40% of the diabetic patients and 20% among non-diabetic patients (as shown in **Figure 3**).

**Table 1.** Distribution of patients by reason of consultation or hospitalization.

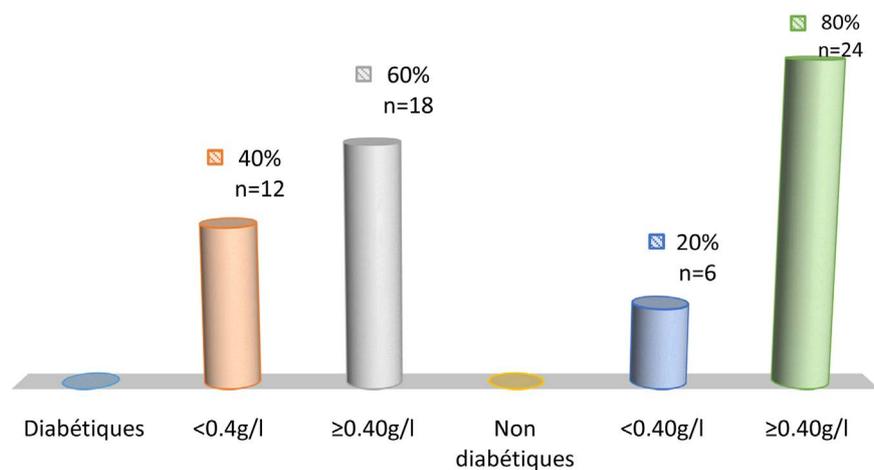
Reason for consultation	Numbers (n)	Frequency %
Diabetes	18	30
Obesity	12	18.7
Syndrome polyuropolydipsic	11	18.3
hyperthyroidism	10	18
Bilateral gonalgia	3	5
Joint pain	2	3.3
Unexplained effort dyspnoea	2	3.3
Sleep Apnea	1	1.7
HBP	1	1.7
Total	60	100



**Figure 1.** Distribution of patients according to triglyceride levels and the concept of diabetes.



**Figure 2.** Distribution of patients according to LDL cholesterol and the concept of diabetes.



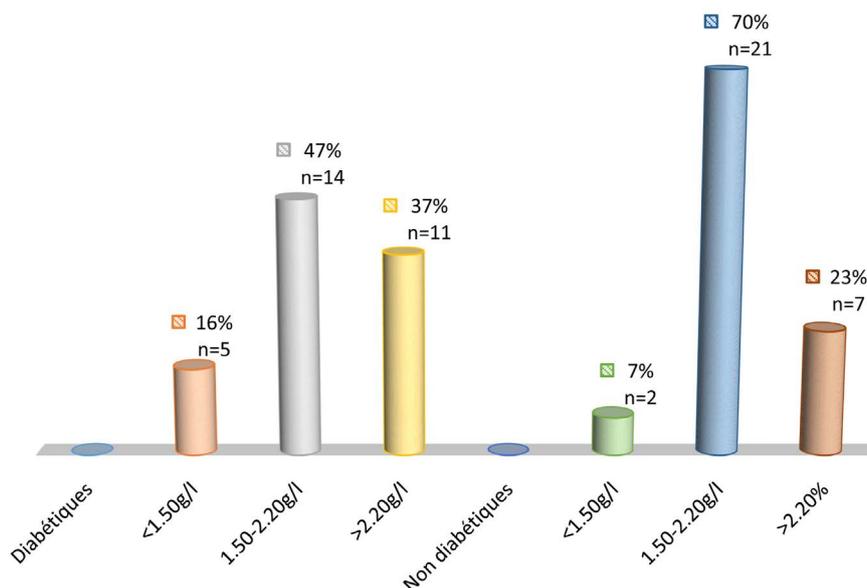
**Figure 3.** Distribution of patients according to the HDL cholesterol level and the concept of diabetes.

A total hypercholesterolemia was found in 37% of the diabetic patients and 23% among non-diabetic patients (as shown in **Figure 4**).

Hyperuricemia was found in 24% of the diabetic patients and 10% among the non-diabetic patients. Eighty seven percent (87%) of diabetic patients had a badly balanced diabetes based on glycated haemoglobin (>7%). Eighty six point seven (86.7%) of our non-diabetic patients had a normal glycaemia against 13.3% who were in hyperglycemia non-diabetic.

Sixty eight point three (68.3%) of our patients were indifferent to obesity (as shown in **Table 2**).

There was no significant statistical relation between the number of daily meals and the degree of obesity ( $p = 0.840$ ). We did not notice any significant statistical



**Figure 4.** Distribution of patients according to the total cholesterol level and the concept of diabetes.

**Table 2.** Distribution of patients by reason of consultation or hospitalization.

Psychological reaction of patients	Numbers (n)	Fréquence %
Indifference	41	68.3
Worry	15	25
Social pride	3	5
Anger	1	1.7
<b>Total</b>	<b>60</b>	<b>100%</b>

correlation between the degree of obesity and the physical activity ( $p = 0.861$ ).

The degree of obesity was not linked to the rate of triglycerides ( $p = 0.792$ ), to the rate of total cholesterol ( $p = 0.894$ ) neither to that of LDL cholesterol ( $p = 0.617$ ). It existed a significant statistical relation between the degree of obesity and the rate of HDL cholesterol ( $p = 0.005$ ). The indifference was more frequent among patients having a moderated obesity than the others that is to say 45% of the cases ( $p = 0.156$ )(as shown in **Table 3**).

It existed a significant statistical relation between the notion of diabetes and the rate of triglycerides ( $p = 0.042$ ). There was not a significant statistical difference between the rate of LDL cholesterol and the notion of diabetes ( $p = 0.584$ ) (as shown in **Table 4**).

#### 4. Commentary and Discussion

The study was carried out at the service of internal medicine of University Hospital Center point G and at the National Center for Diabetes Research. It had as limitation the reduction of the size of the sample due to the duration of the study.

**Table 3.** Relationship between psychological reaction and degree of obesity.

Reactions psychological patients	Degree of obesity						Total	
	Obesity Moderate		Obesity Severe		Obesity morbid			
	n	%	n	%	n	%	n	%
Indifference	27	45	11	18.3	3	5	41	68.3
Worry	4	6.7	8	13.3	3	5	15	20
Anger	0	0	1	6.7	0	0	1	6.7
Social pride	2	3.3	1	6.7	0	0	3	5
Total	33	55	21	35	6	10	60	100

p = 0.156.

**Table 4.** Relationship between the concept of diabetes and LDL cholesterol.

LDL cholesterol	Diabetes				Total	
	Oui		Non			
	n	%	n	%	n	%
≤1.6 g/l	19	31.7	21	35	40	66.7
>1.6 g/l	11	18.3	9	15	20	33.3
Total	30	50	30	50	60	100

p = 0.584.

During the implementation of this study, we have found out that 73.3% of the patients were older than 40 years, with an average age of  $45.83 \pm 14.6$  years old. This could be explained by the predominance of obesity which classically touches the adult after 40 years old [2].

The female sex represented 93.3% with a sex ratio of 0.07 in the two groups.

Charfi [6] finds a female predominance in 80.4% of the cases in a diabetetic population in Tunisia. That could be due to cosmopolitan factors such as menopause, sedentary lifestyle, multi-parity but also the quest for conformity with a referential esthetic model, in developing countries overweight is part of the canons of beauty among the average population.

Household keepers represented 51.7% of the patients, in accordance with the sedentary character of this professional category it becomes the center of obesity.

In the study 66.7% of our patients were limiting their eating diet to the three main daily meals. This result is similar to that of Ba [7] who got similar figures, contrary to the received ideas: obese = overeating.

We found in 93.4% of our patients a past family medical history of obesity and in 58.3% a past family medical history of diabetes. This result is closer to that of Traoré [8] who reported that 93.3% and 80% of his patients had these past family diseases affiliations. Hypertension was present in 43.3% of our patients. This result is similar to that of Ridouane [9] who found out that 40.29% of his pa-

tients were hypertensive. Obesity and diabetes favor hypertension in conformity with the literature.

Android obesity was present in all the men and 91% of women, with an average height of 109.18 cm among men and 115.45 cm among women. This result is closer to that of the study of Charfi [6] in which 99.9% had an android obesity with an average height of 113.77 cm among the men and 111.22 cm among the women.

Gynoid obesity was present in 9% of women. Contrary to the literature's data in which this type of obesity is frequent with the woman. This could be explained by the size of the sample.

More than half of the patients had a BMI comprises between 30 and 34.9 kg/m<sup>2</sup>. This result is similar to that of Charfi [5] who found out an average body mass index of 35.5 kg/m<sup>2</sup>.

Ten percent (10%) of our patients had a morbid obesity. This result is dissimilar to that of the 16% found by Charfi [6]. This could be due to the size of the sample which is largely superior to ours.

In the study we found in conformity with the literature among our diabetic patients that 33% of them had a hypertriglyceridemia, 37% of them had a high LDL cholesterol and 40% of them had a HDL hypocholesterolemia. However, among our non-diabetic patients we found out respectively 10%, 30%, 20%. This difference could be due to the fact the association of diabetes with obesity is the bench of metabolic complications. Charfi [6] found in his study a dyslipidemia in 60.1% of the cases (associating a hypertriglyceridemia with a high LDL cholesterol and a HDL hypocholesterolemia).

The difficulty for the medical care provision and the lack of auto-surveillance of glycaemia constitute an actual fact which contributes to a bad equilibrium of patients. The investigation has revealed that 87% of diabetic patients had a bad balancing of their diabetes based on glycated haemoglobin. This result is similar to that found by Bambatsi [10] 93.6%.

Sixty eight point three percent (68.3%) of our patients were indifferent to obesity.

That is explicated by the idea that weighing to control your weight is considered by several of our patients as the sign of social opulence and that does not necessitate an individualized medical care.

## 5. Conclusions

Obesity associated with diabetes is a supplementary factor of risk mainly for the android type of obesity which was predominant among the population of our study.

The dyslipidemia increases the cardiovascular risk threatening the vital prognosis of the patient. Our study has revealed that the frequency of the metabolic troubles was higher among the diabetic obese patients than among the non-diabetic obese patients mainly the hypertriglyceridemia.

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