

Lipid Profile of Patients Seen in Consultation at the Cardiology Department at the Ignace DEEN National Hospital (City of Conakry, Republic of Guinea)

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Abstract

The study addressed a crucial public health concern of dyslipidemia and its management, with a focus on the Ignace DEEN National Hospital patients, filling a research gap in the Republic of Guinea. It contributed valuable epidemiological data on dyslipidemia in the studied population, emphasizing gender, age, and socio-professional categories, which could inform tailored prevention and management strategies in improving the health care of dyslipidemia patients by proposing diets to help these patients better manage their disease and a food system for preventing dyslipidemia. The study focused on the lipid profile of patients seen at the cardiology department at the Ignace DEEN National Hospital Republic of Guinea (Conakry). This was a prospective, descriptive study lasting six (6) months from January 24 to July 23, 2021; aimed at determining the frequency of lipid abnormalities and pathologies related to the lipid profile. A total of 523 people were included in this study with a female predominance of 59.34% compared to 40.66% of males for a ratio of 1.5 in favor of women. The age groups of 45 - 54 and 55 - 65 were the most affected with respective frequencies of 45.42% and 30.03%. The most represented socio-professional category was that of housewives, *i.e.* 45.78%, followed by traders 18.68%. Our series was dominated by the married couple, *i.e.* 77.29%. Dyslipidemia constitutes a modifiable cardiovascular risk factor in patients seen in the cardiology department at the Ignace DEEN Hospital; its control must be strict through the use of hygienic and dietary rules and hypolipidemia medications.

Keywords

Dyslipidemia, Profile Lipid, Lipid Abnormalities

1. Introduction

Cardiovascular risk factors are clearly increasing in developing countries. Among these factors, dyslipidemia is often found, linked to changes in behavioral and eating habits. Dyslipidemia is a “primary or secondary pathological modification of serum lipids”, it is a chronic metabolic abnormality characterized by a persistent elevation of TG, LDL-C and a decrease in HDL-c. Atherosclerosis, a chronic arterial inflammatory phenomenon induced and maintained by excess circulating cholesterol, constitutes the main cause of cardiovascular conditions [1]. Thus, the risk of coronary heart disease increases with the total cholesterol level independently of other risk factors as shown by the Framingham study [2] [3]. Atherogenic dyslipidemia corresponds to one or more of the following abnormalities: decrease in HDL-c, increase in CT and LDL-C. Dyslipidemia constitutes a public health problem and several observed facts demonstrate its seriousness and strongly suggest that we are paying more attention to it [4]. The Canadian Health Measures Survey (CHMS) revealed that between 2012-2013, dyslipidemia affected 38% of Canadians aged 18 to 79 [5]. In 2016, dyslipidemia affected more than 37% of French adults aged 35 to 64, or 9.1 million people [6]. Several West African and North African studies including that of LP Thiombiano in Guéoul (Senegal) [1], Ben Youcef M. [7] in Tlemcen (Algeria) and Elasm M. [8] in Grand Tunis (Tunisia) had reported respectively 61.3%, 15.9% and 21% dyslipidemia. In Guinea, a study carried out in 2014 in the nephrology department in patients with end-stage chronic renal failure (ESRD) reported 48.15% dyslipidemia [9]. Another carried out in 2015 by Barry NH on metabolic syndrome (MS) in the workplace found a frequency of low HDL-c and high TG of 91.6% and 4.3% respectively [10]. Thus, the high frequency of lipid disorders associated with cardiovascular diseases, the trivialization of the prescription of lipid assessment, ischemic cardiovascular complications linked to dyslipidemia and the rarity of previous specific studies motivated this research. In this study, we focus on the lipid profile of patients seen in consultation at the cardiology department at the Ignace DEEN National Hospital (City of Conakry; Republic of Guinea).

2. Methods

2.1. Study Framework

The medical biology analysis laboratories in the cardiology department at the Ignace DEEN National Hospital and the Biology Department of Gamal Abdel Nasser University (UGANC) were our study areas. This was a prospective, de-

scriptive study lasting six (6) months from January 24 to July 23, 2021. Our study focused on all patients seen in consultation at the cardiology department who carried out the lipid profile during our investigation period. Sampling was simple and random. The sample size ($N = 523$) was obtained by the SCHWARTZ formula. Our study included all patients seen in outpatient consultation in the department during the study period who had completed the lipid profile regardless of the basic pathology, and who had given their agreement to participate in the study.

2.2. Variables Subject to Study

- **Biological variables:** Total cholesterol, HDL cholesterol (CHDL), LDL cholesterol (LDLC), Triglyceridemia.
- **Epidemiological variables:** Frequency, Age, Sex, Marital status, Profession and Residence.
- **Anthropometric variables:** Weight, Height, BMI (Body Mass Index), Waist circumference.
- **Biomaterial:** Patient blood.
- **Clinical variables:** A questioning in search of functional signs; these are the signs that represent a manifestation of an illness, as expressed and felt by our patients (Headache, Palpitation, Vertigo, Dyspnea, Visual blurring, Ringing in the ears, Asthenia, Chest pain, Tinnitus).
- **Paraclinical variables:** Imaging examinations, Chest x-ray.

2.3. Data Collection, Processing and Statistical Analysis

An analysis plan was carried out in accordance with the objectives of our study and including the following sections:

- Determination of the frequency of lipid abnormalities in outpatients.
- Description of the type of lipid abnormality encountered.
- Identification of pathologies related to the lipid profile.
- Study the risk factors associated with dyslipidemia.
- Description dyslipidemia.

Data collection was carried out using a survey sheet (annex) developed according to the objectives and variables through a collection of information and samples taken from patients followed by the analysis of samples of blood of each patient. Finally, the data was entered and presented using the World, Excel, and PowerPoint software from the Office 2013 pack and analysis was carried out using the epi-info 7.2.0.1 software. We noted a statistical link between the variables using the chi-square test when the P -value < 0.05 .

2.4. Ethical Considerations

Before our study was carried out, patients gave their consent to participate in the study, confidentiality was respected throughout the data collection procedure and the results were used for strictly scientific purposes.

2.5. Limitations and Difficulties

The non-cooperation of certain patients constituted our main limitations and difficulties during this study.

3. Results

This study is part of a prospective, descriptive, cross-sectional study aimed at highlighting the frequency of lipid abnormalities in all patients seen in consultation at the cardiology department. Our results are presented in the form of figures and tables, which are discussed and interpreted according to the available literature data.

In **Figure 1**, we see that of the 523 patients received in consultation, 273 presented dyslipidemia, *i.e.* a frequency of 52.19%, and 250 with a lipid profile without dyslipidemia, *i.e.* 47.80%.

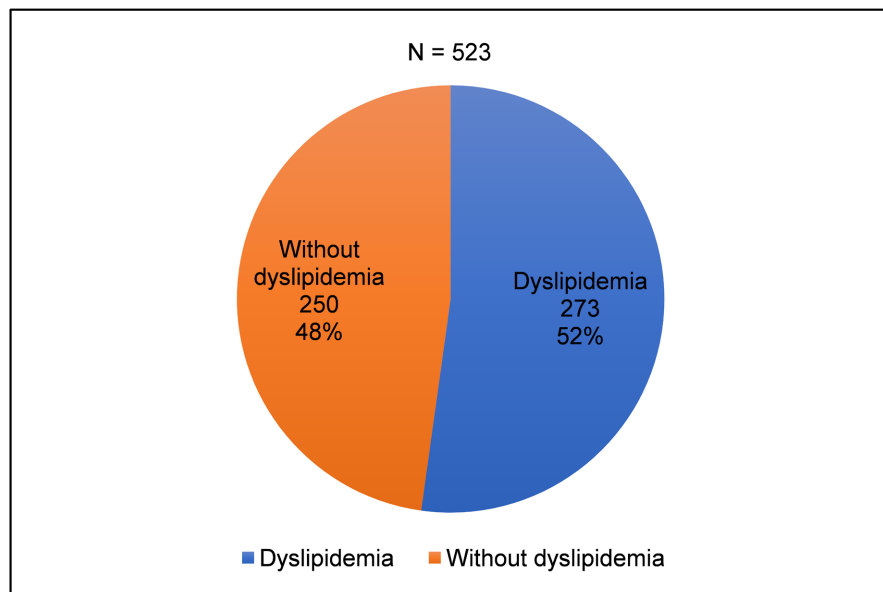


Figure 1. Distribution of patients by lipid profile.

Looking at **Table 1**, we note that lipid abnormalities were more frequent in women (59.34%) than in men (40.66%) with a sex ratio of 0.7.

Table 1. Distribution of patients by sex.

Sex	Dyslipidemia		Without dyslipidemia		P-value
	Patients	%	Patients	%	
Male	111	40.66	98	39.2	0.7338
Feminine	162	59.34	152	60.8	
Total	273	100	250	100	

In **Figure 2**, we understand that the age groups of 45 - 54 and 55 - 64 years were the most affected by dyslipidemia respectively 45%, 42% and 30.03%. The average age was 54.6 years and the extremes were between 25 and 87 years.

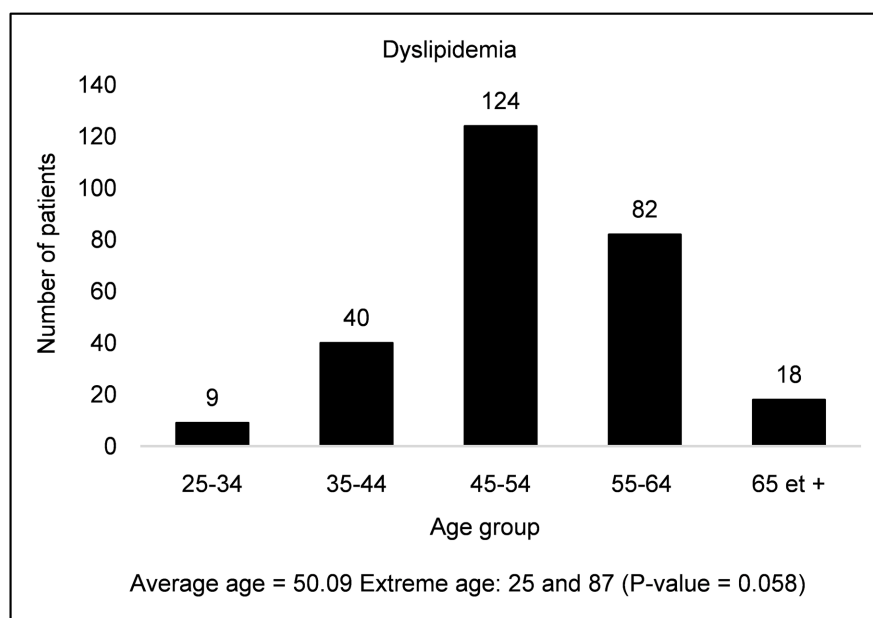


Figure 2. Distribution of dyslipidemia by age group.

Figure 3 reveals that most dyslipidemic patients resided in urban areas, *i.e.* 61.54% compared to 38.46% in rural areas.

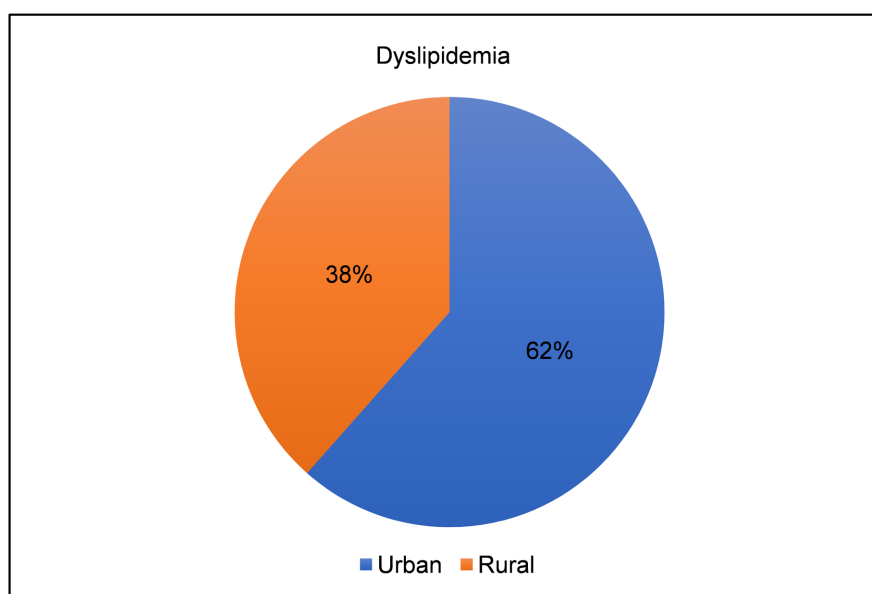


Figure 3. Distribution of dyslipidemic patients by origin.

With regard to **Figure 4**, lipid abnormalities were found in most of the married couples, *i.e.* a rate of 77.29%.

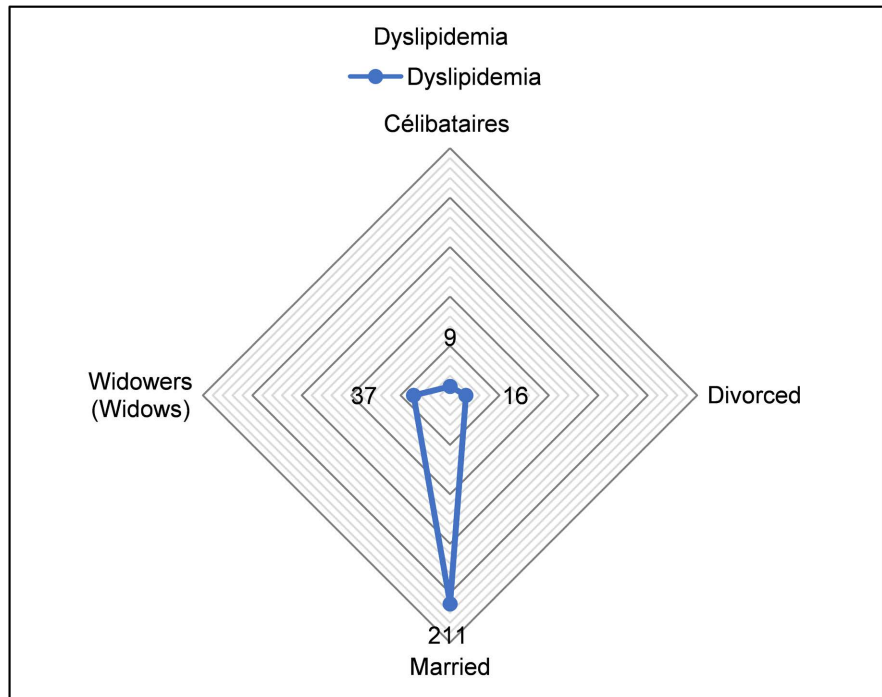


Figure 4. Distribution of dyslipidemic patients by marital status (P-value = 0.5862).

Figure 5 reveals that more than half of the dyslipidemic patients were not in school, *i.e.* 60.07% followed by higher and secondary levels respectively 21.61% and 9.52%.

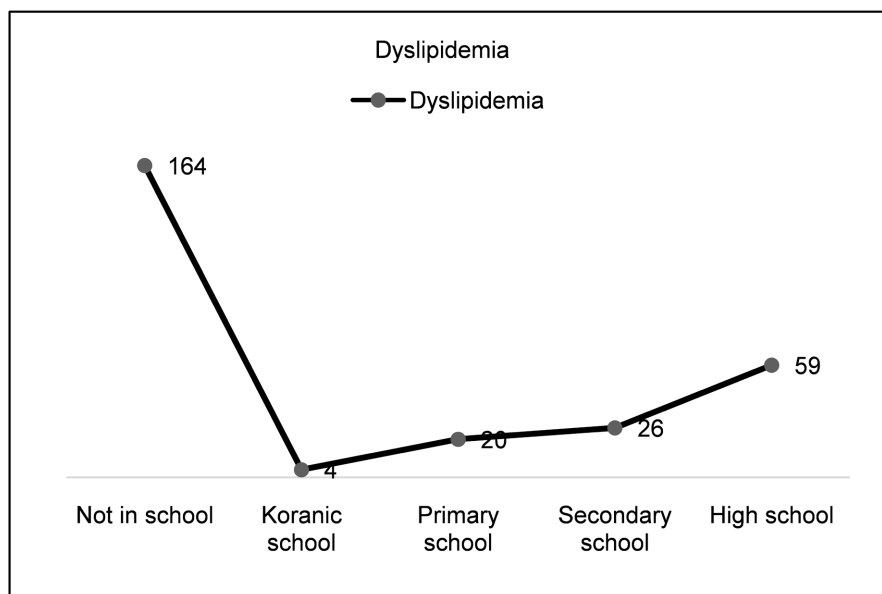


Figure 5. Distribution of Dyslipidemic patients according to level of education (P-value = 0.5242).

Figure 6 shows that housewives were the most affected with a frequency of 45.78%, followed by Merchants with 18.68%.

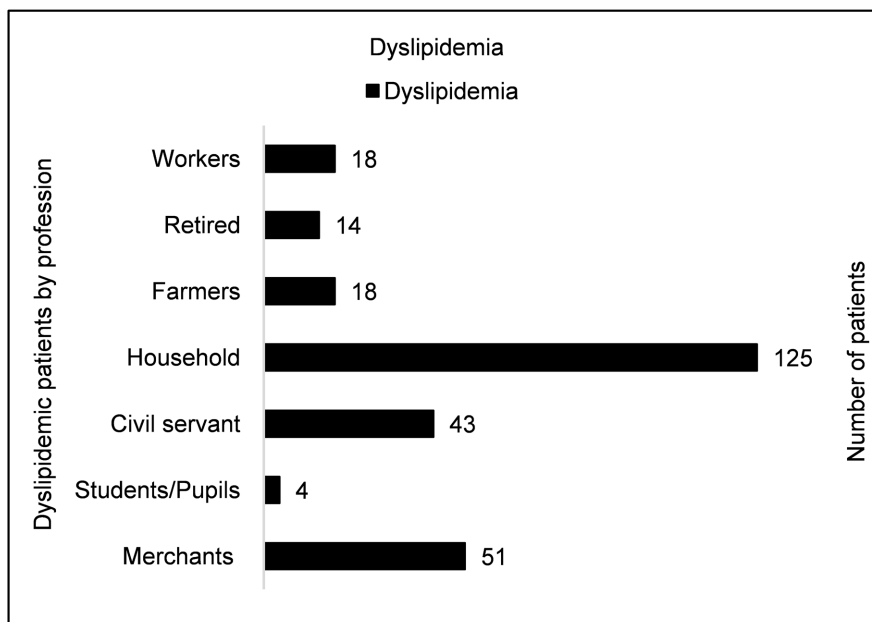


Figure 6. Distribution of dyslipidemic patients by profession (P-value = 0.5798).

Figure 7 reveals that high blood pressure was the most represented cardiovascular risk factor with a frequency of 69.23%, followed by obesity and a sedentary lifestyle with 36.63% and 35.16% respectively.

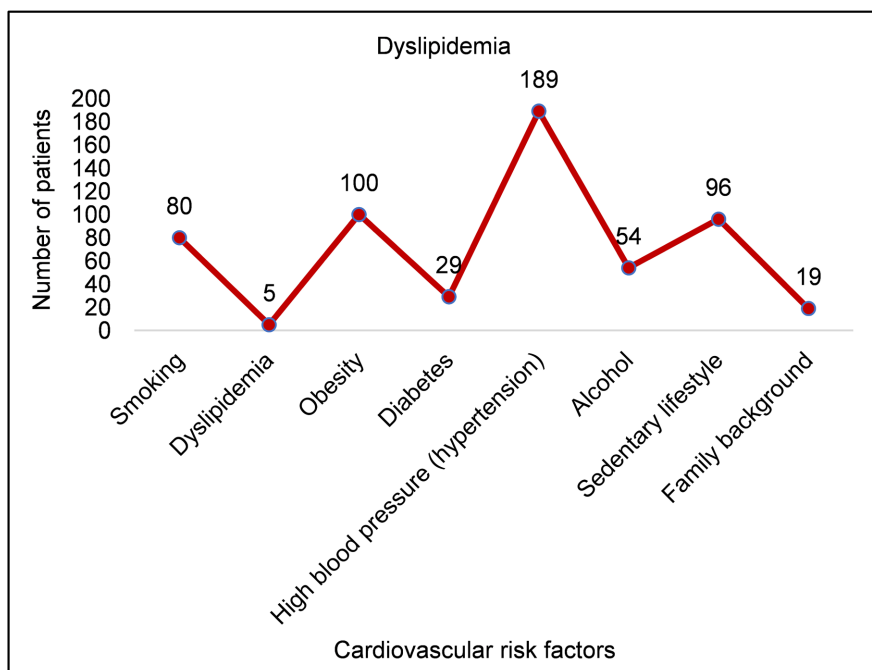


Figure 7. Distribution of patients by cardiovascular risk factors.

Table 2 reveals that seventy-one (71) dyslipidemic patients had severe obesity with a frequency of 23%, followed by moderate obesity with a frequency of 21.24%.

Table 2. Distribution of patients by Body Mass Index (BMI).

BMI	Dyslipidemia		Without dyslipidemia	
	Patients	%	Patients	%
Thinness	6	2.19	6	2.4
Normal	88	32.23	122	48.8
Overweight	41	15.01	43	17.2
Moderate obesity	58	21.24	50	20
Severe obesity	71	23	22	2.8
Morbid obesity	9	3.29	7	2.8
Total	273	100	250	100

In **Table 3**, we found that 63 male dyslipidemic patients had a waist circumference > 94 cm, *i.e.* a frequency of 23.07%, and 79 female patients had a waist circumference > 80 cm, *i.e.* a frequency of 28.94%.

Table 3. Distribution of patients by waist circumference and gender.

Tower of Size		Dyslipidemia		Without dyslipidemia	
		Patients	%	Patients	%
Men	< 94	48	17.58	73	29.2
	> 94	63	23.07	25	10
	Total	111	40.65	98	39.2
Women	< 80	83	30.40	93	37.2
	> 80	79	28.94	59	23.6
	Total	162	59.34	152	60.8

In view of **Table 4**, we understand that 187 cases (68.49%) had a history of high blood pressure and 9 cases (3.29%) had pure hypercholesterolemia. Among the 9 patients with pure hypercholesterolemia, two patients (22.22 %) were under treatment, one on statins and the other one was completely unaware of his treatment. It should be noted that 77.77% of those 9 patients followed a low-calorie diet associated with regular physical activity.

In **Table 5**, we found that headache was the main symptom, followed by dizziness and asthenia with respectively 59.70%, 34.79% and 34.43%.

Table 4. Distribution of patients according to the history.

History	Dyslipidemia		Without dyslipidemia		P-value
	Patients	%	Patients	%	
Cardiovascular disease (CVD)	214	78.38	201	80.4	
Cerebrovascular accident (stroke)	8	2.93	6	2.4	
High blood pressure (HTA)	187	68.49	174	69.6	
Acute coronary syndrome (ACS)	7	2.56	1	0.4	0.5620
Dilated cardiomyopathy (DCM)	5	1.83	1	0.4	
Valvulopathy	11	4.02	23	9.2	
Postpartum cardiomyopathy (PPCM)	0	0	2	0.8	
Rhythm disorder	2	0.73	3	1.2	
Pure hypercholesterolemia	9	3.29	2	0.8	

Table 5. Distribution of patients according to functional signs.

Functional signs	Dyslipidemia		Without dyslipidemia		P-value
	Patients	%	Patients	%	
Dyspnea	47	17.21	58	23.2	0.0882
Palpitations	81	29.67	93	37.2	0.0682
Headache	163	59.70	133	53.2	0.1340
Dizziness	95	34.79	96	38.4	0.3933
Asthenia	94	34.43	79	31.6	0.4921
Chest pain	41	15.01	20	8	0.0124
Tinnitus	31	11.35	62	12	0.6447
Visual blur	63	23.07	30	28.4	0.8187

In **Table 6(a)**, we found that high blood pressure was the most represented cardiovascular risk factor with a frequency of 69.23%, followed by obesity and a sedentary lifestyle with 36.63% and 35.16% respectively. **Table 6(b)** showed that arterial hypertension was the pathology associated with dyslipidemia with a frequency of 82.41%.

Table 6. Distribution of patients according to cardiovascular risk factors.

(a)					
Cardiovascular risk factors	Dyslipidemia		Without dyslipidemia		P-value
	Patients	%	Patients	%	
Smoking	80	29.30	64	25.6	0.3440
Dyslipidemia	5	1.83	2	0.8	0.0471
Obesity	100	36.63	55	22	0.0003
Diabetes	29	10.62	31	12.4	0.5245
High Blood Pressure	189	69.23	173	69.2	0.9939
Alcohol	54	19.78	56	22.4	0.4632
Sedentary lifestyle	96	35.16	80	32	0.7292
Family history	19	6.95	28	11.2	0.0906
Stress	29	10.62	38	15.2	0.1180
(b)					
Disorders	Dyslipidemia		Without dyslipidemia		P-value
	Patients	%	Patients	%	
High Blood Pressure	225	82.41	206	82.4	0.9958
Valvulopathies	15	5.49	27	10.8	0.0259
Pericarditis	3	1.10	4	1.6	0.6187
Angina	34	12.45	11	4.4	0.0010

Table 7, according to the grade of arterial hypertension reveals that 75.89% of the partners were at Grade II.

Table 7. Distribution of patients according to the grade of high blood pressure.

Hypotension grade	Dyslipidemia		Without dyslipidemia		P-value
	Patients	%	Patients	%	
I	52	23	57	27.40	
II	167	75.89	143	68.75	0.3996
III	7	3.09	8	3.84	
Total	226	100	208	100	

It emerges from **Figure 8** that pure hypercholesterolemia was the most encountered dyslipidemia type with a frequency of 39.35%, followed by hypercholesterolemia (HDL) with 28.80%.

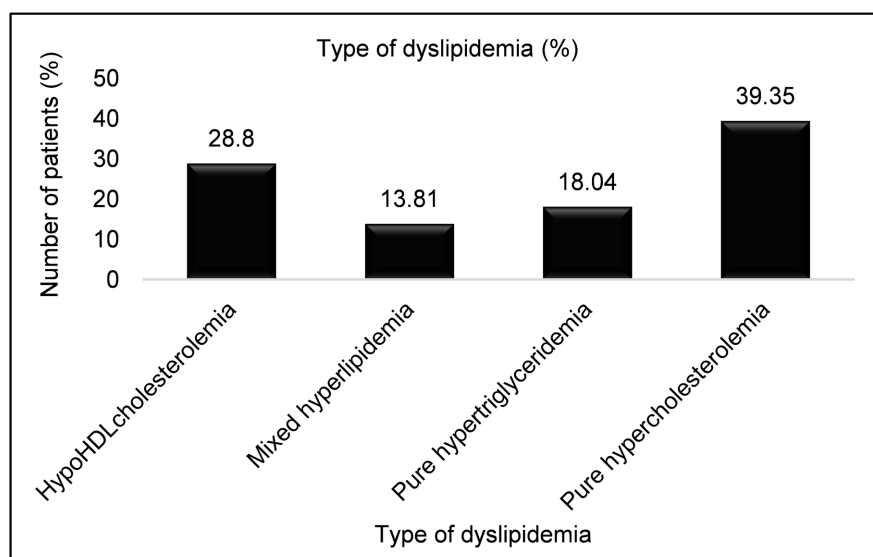


Figure 8. Distribution of patients by type of dyslipidemia.

It emerges from **Figure 9** that the type and level of dyslipidemia, high total cholesterol level was the most represented anomaly with a frequency of 32.31%, followed by high LDL-C with a frequency of 31.93%.

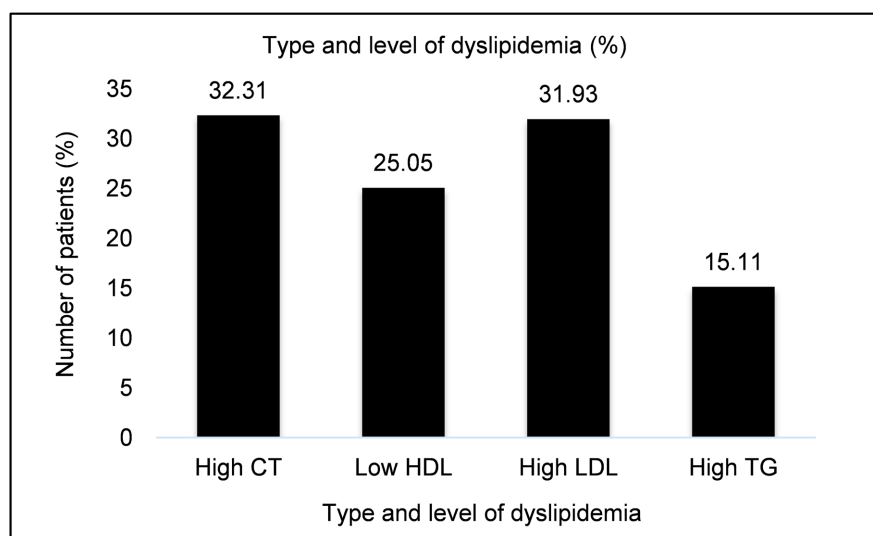


Figure 9. Distribution of patients according to type and level of dyslipidemia.

In **Table 8**, among the therapeutic classes received by dyslipidemic patients, statins were the most used with a frequency of 88.27%, followed by Conversion Enzyme Inhibitors and diuretics with respective frequencies of 72.89% and 53.11%.

Table 8. Distribution of patients according to the therapeutic classes used.

Treatment	Dyslipidemia		Without dyslipidemia		P-value
	Patients	%	Patients	%	
Statins	241	88.27	11	4.4	0.00
Beta-blockers	113	41.39	88	35.2	0.1463
Digitalis	4	1.46	4	1.6	0.9032
Conversion enzyme inhibitor (CEI)	199	72.89	156	62.4	0.0103
Calcium inhibitor	68	24.90	65	26	0.7748
Nitre derivatives	9	3.29	9	3.6	0.8494
Diuretics	145	53.11	139	55.6	0.5689
Angiotensin II receptor antagonist	10	3.66	15	6	0.2112
Antiarrhythmic agent	5	1.83	8	3.2	0.3158
Anti vitamin k	8	2.93	8	3,2	0.8582
Low-molecular-weight heparin (LMWH)	19	6.95	19	7.6	0.3386
Antidiabetics	16	5.86	13	5.2	0.7418
Antiplatelet drug	98	35.89	50	20	0.0001
Antianginal agents	12	4.39	8	3.2	
Anti anemic	13	4.76	9	3.6	

It appears from **Table 9** that atorvastatin was the most used type of statin, followed by simvastatin with frequencies of 68.13% and 20.14%, respectively.

Table 9. Distribution of patients according to the type of statin used.

Type of statin	Dyslipidemia		Without dyslipidemia		P-value
	Patients	%	Patients	%	
Atorvastatin	186	68.13	7	2.8	0.00
Simvastatin	55	20.14	4	1.6	0.00

In **Table 10**, among the foods consumed by dyslipidemic patients whose frequency of consumption is greater than or equal to 3 times per day, cereals (100%), oils (100%), milk and dairy products (54.21%), and the group: meat, fish

and eggs (100%) were the most consumed. Sweet products (23.08%) were the least consumed among dyslipidemic patients.

Table 10. Distribution of dyslipidemic patients according to food intake over the last 7 days.

Food groups	Number < 3*/day	Number ≥ 3*/day
Cereals	0 (0.00%)	273 (100%)
Tubers	108 (39.56%)	165 (60.44%)
Leguminous	120 (43.96%)	153 (56.04%)
Peanut	200 (73.26%)	73 (26.74%)
Oils	0 (0.00%)	273 (100%)
Milk and dairy products	125 (45.79%)	148 (54.21%)
Sweet products	210 (76.92%)	63 (23.08%)
Fruits	136 (49.82%)	137 (50.18%)
Vegetables	70 (25.64%)	203 (74.36%)
Meat, fish, egg	0 (0.00%) N = 273	273 (100%)

4. Discussion

This study carried out on patients seen in consultation at the cardiology department at the Ignace DEEN National Hospital in the City of Conakry in the Republic of Guinea, aimed to determine the frequency of lipid abnormalities in the latter with a view to proposing a strategy management of so-called dyslipidemia by our hospital structures. The study showed that of the 523 patients received, 273 had dyslipidemia, *i.e.* a frequency of 52.19%, compared to 250 patients, *i.e.* 47.80% without dyslipidemia (**Figure 1**), our results are lower compared to the results reported by LP Thiombiano *et al.*, who found a frequency of 61.3% dyslipidemia in Gueoul in Senegal [1] and on the other hand higher than that found in several other studies from North Africa in particular, by Ben Youcef M. *et al.* in Tlemcen (Algeria) [7] and by Elasmî M. *et al.* [8] in Grand Tunis (Tunisia) found much lower respective prevalences of dyslipidemia, *i.e.* 15.9% and 21%. This discrepancy could be explained by the choice of different limits for normal lipid values, as well as by differences in laboratory methods, or environmental conditions of the populations. Lipid abnormalities were more frequent in women (59.34%) than in men (40.66%) with a sex ratio of 1.5 (**Table 1**). In Saint-Louis in 2010, Pessinaba *et al.* [11] also found a female predominance (72.3% versus 47.4%) with a risk multiplied by 2.59 for women. A female predominance for lipid abnormalities was also noted in Elasmî M, and cool in Tunisia [8] with

36.5% in men and 49.5% in women. Knowing that it is at the average age of 51 that women become menopausal [11], the hypercholesterolemia observed in a significant number of women during this study could be explained by menopause itself. But the effect of age could, in itself, explain the changes observed. It therefore seems important to know how to distinguish the effect of age from the effect of menopause on changes in the lipid profile in women. In addition, the age groups of 45 - 54 and 55 - 64 years were the most affected with 45.42% and 30.03% respectively. The average age was 50.09 years and the extremes ranged from 25 to 87 years (Figure 2). Our results are superimposable to those found by K. Jamoussi *et al.* [12] in Tunisia who reported that the age ranges of patients varied from 25 to 62 years with an average of 46.6 years \pm 10.4 years. This high frequency in our series could be explained by the fact that young people constitute the majority of the population in Africa on the one hand and on the other hand by the fact that this age group is the most active and therefore the most exposed. On the other hand, in our study, housewives were the most affected with a frequency of 45.78%, followed by traders with 18.68% (Figure 6). This high frequency in these sectors of activity could be explained by the more or less unfavorable standard of living, the sedentary lifestyle generally due to lack of time, and the high-calorie diet in these women thus accumulating risk factors such as obesity, hypertension and type 2 diabetes on the one hand, and on the other hand by the size of our sample. It should also be noted that most of our dyslipidemic patients resided in urban areas with 61.54% compared to 38.46% in rural areas (Figure 3). Our results are similar to those found by Kane A. and Pessinaba S. in Dakar during a survey on cardiovascular risk factors in Saint Louis [13]. This high frequency in our study could be explained by the fact that in urban areas, the population consumes a lot of imported foods rich in lipids (Table 10) and exercises less physical activity, unlike the rural population which consumes natural, less fatty foods. and practices plus physical work. Lipid abnormalities were found in most married couples, with a frequency of 77.29% (Figure 4). Our result is comparable to that found by Traore A. [14] who reported a frequency of 83.3% among married couples. More than half of our patients were not in school with a frequency of 60.07%, followed by higher and secondary education with 21.61% and 9.52% respectively (Figure 5). Our results are superior to those of M. Elasmî *et al.* [15] who reported 29% not in school, 22% at secondary level and 19% at higher level. This difference in our series could be explained by the low economic income leading to a low schooling rate in our country. During our study, seventy-one of our patients with dyslipidemia had severe obesity, with a frequency of 23%, followed by moderate obesity with 21.24% (Table 2). Our result is contrary to that reported by Chaari *et al.* [16] who observed a predominance of moderate obesity, *i.e.* 15.9% and 5.7% of severe obesity. On the other hand, Asma Ezzaher *et al.* [17] in Tunisia found 33.1% obese and 30.7% overweight. In the same dynamic E. Bruckert *et al.* [18] in France reported 45.4% and 26.4% respectively. Furthermore, McElroy *et al.* [3]

report different values of around 44% and 20%. The chi-square test allowed us to show that there is a statistically significant difference in proportion between obesity and dyslipidemia because p -value < 0.05 (Table 6). This could be explained by the fact that obesity is one of the major risk factors for the occurrence of dyslipidemia. In addition, sixty-three of our male patients had a waist circumference > 94 cm, *i.e.* a frequency of 23.07%, and seventy-nine female patients had a waist circumference > 80 cm, *i.e.* a frequency of 28.94% (Table 3). Our result is lower than that reported by Sossa AOJ-P [9] in his doctoral thesis in 2014 who found a frequency of 42% in men and 36% in women. It appears from our study that arterial hypertension was the pathology most associated with dyslipidemia with a frequency of 82.41% (Figure 7). This association is noted in the literature with a stronger correlation [13] [19] [20], followed by stable angina in 12.45%. Tina Z. Khan *et al.* in London, UK [21] in their study cohort with refractory angina at the tertiary cardiology center reported that 60% of 75 patients with refractory angina had elevated levels of lipid parameters. Furthermore, it appears from our study that pure hypercholesterolemia was the most encountered type of dyslipidemia with a frequency of 39.35%, followed by hypocholesterolemia (HDL) with 28.80% (Figure 8). Our results are lower than those reported by Lokrou [22] in Ivory Coast who found 44% pure hypercholesterolemia and 37.2% hypocholesterolemia (HDL), however, they are higher than that published by the Monica centers which reported that in France pure hypercholesterolemia remains the most frequently encountered anomaly (30%), accompanied by an isolated drop in HDL cholesterol (12%). This difference in frequency is explained by the fact that this is a rather caricatured classification that does not reflect the subtleties of the pathophysiology of dyslipidemia. However, it is a pragmatic approach to best manage the various lipid abnormalities in daily practice. According to the type and level of dyslipidemia, high total cholesterol level was the most represented abnormality, followed by high LDL-C with respective frequencies of 32.31% and 31.93% (Figure 9). Our result is similar to that reported by Pessinaba S. *et al.* In Saint Louis in Senegal in 2010 found 36.3% total hypercholesterolemia and 20.6% hyper LDLcholesterolemia. [23] This high frequency of these entities is explained by the fact that the thresholds for defining the components of dyslipidemia have changed; the threshold for total hypercholesterolemia has gone from 2.6 to 2 g/L, thus increasing our prevalence. Nevertheless, this study revealed that headaches were the main symptom, followed by dizziness and physical asthenia which led patients to consult with a frequency of 59.70%, 34.79% and 34.43%. respectively (Table 5). Furthermore, our study revealed that one hundred and eighty-seven cases (68.49%) had a history of high blood pressure and nine cases (3.29%) of pure hypercholesterolemia. Among the 9 patients with pure hypercholesterolemia, two patients (22.22%) were under treatment, one on statins and the other one was completely unaware of his treatment. It should be noted that 77.77% of those 9 patients followed a low-calorie diet associated with regular physical activity. In Saint Louis,

Pessinaba *et al.* [13] [23] found similar results, *i.e.* 20.6% under drug treatment and 73% under a hypocaloric diet. In addition, our study showed that the distribution according to the grades of arterial hypertension showed that 75.89% of the patients were grade II (Table 7). Our result differs from that of Youmbissou T. *et al.* [24] in Cameroon which reported 65.67% grade III and 26.11% grade II. The lack of education, information for patients and its immediate consequences followed by the low socio-economic level of the population complicates access to early consultation. Furthermore, our study showed that high blood pressure was the most represented cardiovascular risk factor with a frequency of 69.23%, followed by obesity and a sedentary lifestyle with 36.63% and 35.16% respectively (Table 6(a)). Our result is similar to those reported by Inès Kharrat *et al.* [25] in Tunisia who found that high blood pressure was the most common risk factor with a frequency of 60%. This high frequency is explained on our part by the fact that arterial hypertension and dyslipidemia are two major risk factors linked to eating habits, a sedentary lifestyle and age, particularly in association with abdominal obesity and diabetes-causing metabolic syndrome. Indeed, the majority of patients had at least two risk factors (55.67%). We noted an association of three or more risk factors in 41.75% of cases. These results could be explained by the fact that most of our patients were hypertensive and obese. Furthermore, the association of dyslipidemia and diabetes did not present any statistically significant link ($p = 0.52$). In Saint Louis, Kane A. and Pessinaba S. [23] found a stronger correlation because it was significant ($p = 0.001$). Dyslipidemia in diabetics may be explained by the phenomenon of insulin resistance [26]. It appears from our study that arterial hypertension was the pathology most associated with dyslipidemia with a frequency of 82.41% and a statistically insignificant difference (p -value = 0.99). This association is noted in the literature with a stronger correlation [20] [23] [26], followed by stable angina in 12.45% (Table 6(b)). Tina Z. Khan *et al.* in London, UK [21] in their study cohort with refractory angina at the tertiary cardiology center reported that 60% of 75 patients with refractory angina had elevated levels of lipid parameters.

Limitations of the Study

This study had limitations. However, while the sample size of 523 allows acceptable conclusions to be drawn, not all patients were dyslipidemic. Nevertheless, this work has conceptual value and could serve as a reference for future studies. It demonstrated that 52.20% of patients seen in consultation at the cardiology department of Ignace Deen Hospital were diagnosed with dyslipidemia, a metabolic disease.

5. Conclusion

At the end of this study on the lipid profile of patients seen in consultation at the cardiological department of the Ignace Deen National Hospital, dyslipidemia remains common. However, our results showed the emergence and clear pro-

gression of this metabolic syndrome which results in an isolated drop in HDL cholesterol, an increase in total cholesterol, LDL cholesterol, and triglycerides. This fact is explained by a poor lifestyle (sedentary lifestyle, low fruit and vegetable consumption). Most of our patients were female, resided in urban areas and were housewives. Effective strategic management, an adapted diet, regular physical activity, a change in lifestyle in patients in particular and in the population in general are recommended to avoid the installation of this “silent killer” as well as its complications.

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Author Contributions

All authors contributed to this research and read and approved the final version of the manuscript.

Ethical Approval Statement

Confidentiality was respected throughout the data collection process and all results were used for strictly scientific purposes.

Statement of Informed Consent

Before our study was carried out, patients gave their consent to participate in the study.

Conflicts of Interest

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

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Annex

Investigation sheet

No. / ____ /

Identify:

No. file: ____

Date of entry: ____ / ____ / ____

1) General information

Age / ____ / Sex: Masculine / ____ / Feminine / ____ /

Instruction level: Primary / ____ / Secondary / ____ / Superior / ____ / Koranic School / ____ / None / ____ /

Socio-professional activities: Pupils / ____ / Students / ____ / Official / ____ / Traders / ____ / Housewives / ____ / Peasants / ____ / Retirees / ____ / Workers / ____ /

Provenance: Urban / ____ / Rural / ____ /

Matrimonial situation: Married / ____ / Single / ____ / Divorced / ____ / Widower / ____ / Weight / ____ / Size / ____ / BMI / ____ /

IMC assessment: Thin / ____ / Normal Weight / ____ / Overweight / ____ / Moderate Obesity / ____ / Severe Obesity / ____ / Morbid Obesity / ____ /

2) History

ATCD of MCV: Yes / ____ / No / ____ / Which / _____ /

Dyslipidemia: Yes / ____ / No / ____ / If so type / _____ /

3) Cardiovascular risk factors

Age/Sex / ____ / Tabagism / ____ / Dyslipidemia / ____ / Obesity / ____ / Diabetes / ____ / Hta / ____ / Alcohol / ____ / Sedentarity / ____ / ATCD Family / ____ / Stress / ____ / Number of FRCV / _____ /

4) Functional signs

Dyspnea / ____ / Palpitations / ____ / Cepel / ____ / Vertigo / ____ / Asthenia / ____ / Epigastralgia / ____ / Toux / ____ / Thoracic pain / ____ / Hepatalgia / ____ / Fever / ____ / BD / ____ / Acouphène / ____ / Flou Visual / ____ /

5) Physical signs

Signs of ICD: TJ / ____ / RHJ / ____ / Heart blow: Yes / ____ / No / ____ / If so type / _____ /

HPMG / ____ / OMI / ____ / GALOP G: Yes / ____ / No / ____ / Gallop D: Yes / ____ / No / ____ / B2 Pulmonary B2 / ____ / ASCITE / ____ /

6) Clinical parameters

TA (MMHG) / _____ / FC (BAT/MIN) / _____ / HTA grade / _____ /

Waist size / _____ /

Size sex-turn: Man: > 94 / ____ / < 94 / ____ / Women: > 80 / ____ / < 80 / ____ /

7) Biological data and imaging

Biological parameter

Total cholesterol / ____ / LDLC / ____ / HDLC / ____ / Triglycerides / ____ /

Type of dyslipidemia: Dyslipidemic patient / ____ / Non dyslipidemic / ____ / If yes, pure hypercholesterolemia / ____ / Hypo HDL cholesterolemia / ____ / Mixed hyperlipidemia / ____ / Hypertriglyceridemia pure / ____ /

Cholesterol T high / ____ / HDL low / ____ / LDL high / ____ / TG high / ____ / Blood sugar / ____ / HB rate / ____ /

Imagery

ECG: Normal /___/ Abnormal /___/ Type /___/

X-ray: Yes /___/ No /___/ Value /ICT /___/

ICT/appreciation: Normal /___/ Cardiomegaly /___/

Cardiac echo-doppler: Yes /___/ No /___/

8) Ultrasound signs

Cavitaire dilation: Yes /___/ No /___/ OD /___/ Og /___/ VD /___/ VG /___/

Parietal hypertrophy: Yes /___/ No /___/ Interested Wall /_____/

Kinetic disorder: Yes /___/ No /___/ Interested Wall /_____/

Fe % in tiecholz /_____/

% in Simpson Biplan /_____/

Relaxation disorder: Yes /___/ No /___/

Thrombus process: Yes /___/ No /___/ Location /_____/

Valvular leak: Yes /___/ No /___/

Valvular stenosis: Yes /___/ No /___/

9) Cardiovascular disease interested

HTA /___/ Dilated cardiopathy /___/ Valvulopathy /___/ Pericardite /___/ Angor /___/

10) Treatments

Statins: Atorvastatin /___/ Pravastatin /___/ Simvastatin /___/

Rosuvastatin /___/ Statines /___/

Fibrates: Benzafibrate /___/ Ciprofibrate /___/ Phenofibrate /___/

Betabloquant /___/ Digitalis /___/ IEC /___/ Anticalcique /___/

Nitrated derivatives /___/ Diuretics /___/ ARA II /___/ Anti-arrhythmic /___/

AVK /___/ HBPM /___/ Antidiabetic /___/ AAP /___/ OTHER /_____/

Food group	In the last 24 hours Code: 0 to 7		In the last 7 days Code: 0 to 7
	Yes = 1 No = 2	Frequency	
1) Sorghum, Rice, Corn, Fonio			
2) Potato, Yam, Potato, Cassava			
3) Bean, Pea, Soy			
4) Peanut			
5) Oil, Cow butter			
6) Milk and Dairy Product			
7) Sugar, Honey, Sugar cane			
8) Fruits (Mango, Orange, Papaya, Banana, Pineapple)			
9) Vegetables (Cabbage, Spinach, Carrot, Tomato, Eggplant, Leaves, Okra)			
10) Meat/Fish/Egg			