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Metabolic Syndrome: Epidemiological, Clinical and Biological Profiles in the Cardiology and Internal Medicine Departments of the Mother-Child CHU "Luxembourg"

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Abstract

Introduction: The metabolic syndrome is a clinical entity defined by the association in the same subject of four of the following five factors: abdominal obesity (or android), type 2 diabetes, hypertension, hypo HDL cholesterolemia, hypertriglyceridemia. The aim of the work was to study the epidemiological, clinical-biological profiles and complications of patients in the cardiology and internal medicine department of the Mother-Child CHU "Luxembourg". **Materials and Methods:** We carried out a cross-sectional study, from September 2019 to June 2020 in the cardiology and internal department of the mother-child CHU "Luxembourg". All patients with metabolic syndrome admitted to the two departments who agreed to participate during the study period were included in the study. These patients meet the 2009 harmonization attempt criteria (IDF 2009). The variables studied were: socio-demographic characteristics (sex, age, profession), pathological history, clinical signs (functional signs, BMI, waist size), paraclinical signs (ECG, cardiac ultrasound, laboratory assessment) and complications. **Results:** A total of 104 patients were included. The female sex represented 58.65% of cases. The 60 to 69 age group was the majority with 40.78%, housewives occupied 41.34% of cases. Diabetes, arterial hypertension and dyslipidemia were the most represented cardiovascular risk factors with respectively: 80.77%,

79.81% and 53.85%. Visual blurring was the most common functional sign with 23.08% of cases. Moderate obesity was observed in 34% of patients. Waist circumference was high in 39.53% of male patients and 37.70% of female patients. Cardiac ultrasound found a severely collapsed ejection fraction in 25% of patients. HDL-c levels were low in 64.52% of male patients and 75% of female patients. The most observed complications were: dyslipidemia (53.85%), stroke and renal failure with 23% respectively. **Conclusion:** The metabolic syndrome remains a real public health problem, constantly increasing in our populations and constitutes a danger by its constituent elements.

Keywords

Metabolic Syndrome, Epidemiological Profiles, Clinical-Biological, CHUME, Luxembourg, Bamako

1. Introduction

Metabolic syndrome is a clinical entity defined by the association in the same subject of four of the following five factors: abdominal obesity (or android), type 2 diabetes, hypertension, hypo HDL cholesterolemia, hypertriglyceridemia. Heredity, a sedentary lifestyle and eating habits play a very important role in its development [1]. Metabolic syndrome significantly increases the risk of cardiovascular disease [2]. Since its initial description by REAVEN in 1988 under the term "syndrome X", the metabolic syndrome has continued to evolve and several definitions are currently proposed [2]. It is characterized by hyperinsulinism resulting from insulin resistance and a group of factors including hypertriglyceridemia, hypo HDL cholesterolemia, glucose intolerance, high blood pressure and android obesity [1]. The prevalence of metabolic syndrome is increasing rapidly in both developed and emerging countries as well as in developing countries. North American data from the latest NHANES III registry suggests that 20% - 30% of adults living in the United States are affected by this syndrome [2]. The DESIR study [3] found an incidence of 16% in men and 11% in women and the MONICA study rates of 23.5% and 17.9%, respectively, in France [4]. In 2015, KABA found in the internal medicine department of Conakry University Hospital a prevalence of 23%, of which men represented 63% [5] while MEHREZ observed 6.57% with a female predominance in a Senegalese population in 2017 [6]. In Mali, in 2008 TRAORE observed a prevalence of 12.5% with a clear female predominance of 76% in the internal medicine department of CHU POINT G [7]. BERTHE observed 68% in the diabetic population of Bamako [8] in 2009. COULIBALY found 58% in a study carried out in 2015 [9]. The metabolic syndrome is a real public health problem because of its complications (cardiovascular and type 2 diabetes), the absence of data at the level of the Mother-Child University Hospital "Luxembourg" motivated us to carry out this work with the aim of studying the epidemiological, clinical-biological profiles and the related

complications in the cardiology and medicine department at the Mother-Child University Hospital "Luxembourg" in Bamako.

2. Materials and Methods

This is a cross-sectional study, which took place from September 2019 to June 2020 in the cardiology and internal medicine department of the mother-child CHU "Luxembourg". Inclusion criteria: Were included in this study all patients with metabolic syndrome in the two departments who came in consultation or hospitalized who agreed to participate during the study period and who meet the criteria of the attempt to harmonize 2009 (IDF 2009). Patients with metabolic syndrome who did not meet the criteria of the 2009 harmonization attempt (IDF 2009) were not included in the study, as patients with metabolic syndrome did not agree to participate for a period of the study period. The data was collected from patient medical records collected on survey forms created using Epi info 7 software version 7.2.2.6. Informed consent was obtained with strict respect for confidentiality. The variables studied were (mixed): socio-demographic characteristics (sex, age, profession), pathological history, clinical signs (functional signs, BMI, waist size), para clinical (ECG, cardiac ultrasound, laboratory assessment) and complications. Epi info 7 version 7.2.2.6, Excel and Word software were used for data collection and analysis, the results presented in tabular and graphical form.

Definitions of terms:

HbA1C: Glycated hemoglobin

LDL cholesterol: Low density lipoprotein

HDL cholesterol: High density lipoprotein

Criteria of the 2009 harmonization attempt (IDF 2009):

The new definition of harmonization of the SM or IDF 2009 is based on the association in the same individual of at least 3 of the criteria mentioned in Table 1 below.

Table 1. Attempt to harmonize criteria for metabolic syndrome [22:24].

	3 Necessary criteria
Waist size	Increase defined by ethnicity
Triglycerides	>1.50 g/l or specific treatment for this lipid disorder
Arterial Pressure	≥130/85 mmHg, or high blood pressure treated
High density lipoprotein cholesterol	<0.40 g/l (men); <0.50 g/I (women)
Fasting blood sugar	≥1.10 g/l

Ethical Considerations:

All patients give their verbal consent, being informed about the procedures in the study, their harmless character and even anonymous treatment of their data.

3. Results

During this study, we identified 104 patients according to the 2009 harmonization attempt. The female sex occupied 58.65% of cases and the male sex 41.35% with a sex ratio = 0.70.

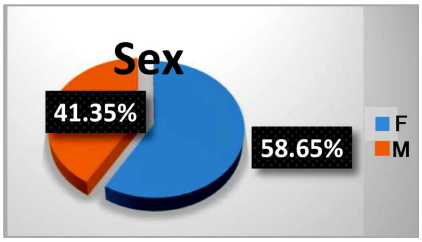


Figure 1. Distribution by gender.

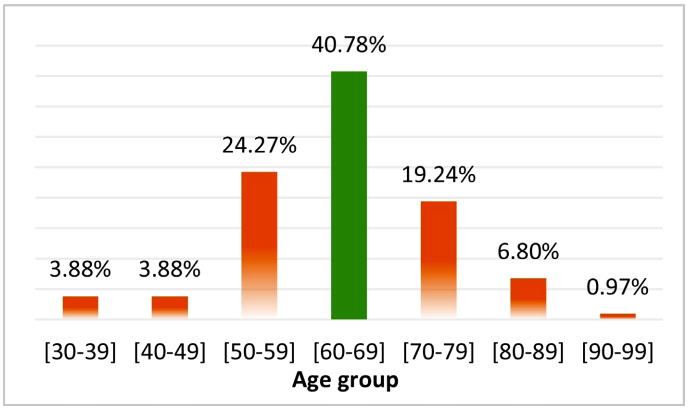


Figure 2. Distribution by age group.

The 60 - 69 age group accounted for 40.78%. The average age was 63.00 ± 11.44 years, with extremes ranging from 30 to 98 years.

Table 2. Distribution according to profession.

Profession	N	%
Trader	11	10.58
Consultant	3	2.90
Farmer	4	3.85
Commercial employee	2	1.92
Hygienist	2	1.92
Housewives	43	**41.34**
Professor	1	0.96
Retired	16	15.38
Sales woman	2	1.92
Others	20	19.23
Total	104	100

Source: Medical file.

Housewives accounted for 41.34% of cases.

Table 3. Distribution according to personal history.

Personal History	N	%
Diabetes	84	**80.77**
HTA	83	**79.81**
Dyslipidemia	56	**53.85**
Stroke	14	13.46
Myocardial Infarction	4	3.85
Obliterating arteriopathy of the lower limbs	8	7.69
Drop	5	4.81
Smoking	16	15.38
Alcoholic	5	4.81

Source: Medical file.

Diabetes, arterial hypertension and dyslipidemia were the most represented risk factors with respectively: 80.77%, 79.81% and 53.85%.

Table 4. Distribution according to functional signs.

Clinical signs	N	%
Visual blur	24	**23.08**
Dyspnea on exertion	23	**22.12**
Leg pain	19	18.27
Headache	18	17.31
Chest pain	17	16.35
Palpitations	12	11.54
Dizziness	10	9.62
Dyspnea at rest	7	6.73
Ringing in the ears	7	6.73
Sleep Apnea	5	4.81
Syncope	2	1.92

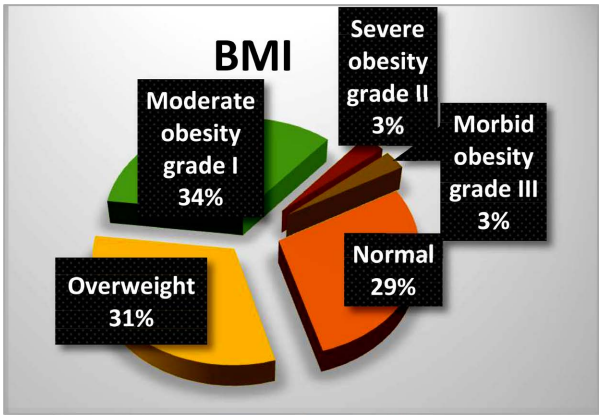
Source: Medical file.

Visual blurring was present in 23.08% of cases, followed by dyspnea on exertion with 22.12%.

Moderate obesity was observed in 34% of patients and overweight in 31%.

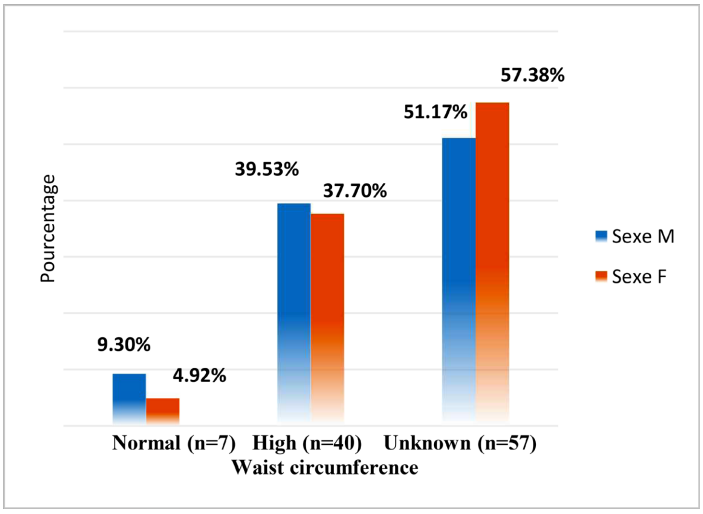
Waist circumference was high in 39.53% of the male patients with an average of 104 ± 11.04 cm against 37.70% for the female patients (average = 100 ± 15.22 cm).

Sinus rhythm in 55.77% of cases, cardiac ultrasound found a severely collapsed ejection fraction in 25% of patients, hyperglycemia accounted for 51%,



Source: Medical file.

Figure 3. Distribution according to BMI (body mass index) class.



Source: Medical file.

Figure 4. Distribution according to waist circumference.

Table 5. Breakdown according to paraclinical examinations.

Para clinical variables	N	%
EKG		
Sinus rhythm	**58**	**55.77**
Conduction disorder	12	11.54
Rhythm disturbance	11	10.58
Echocardiography		
LVEF retained	71	**68.00**
Moderately collapsed LVEF	7	7.00
Severely collapsed LVEF	26	**25.00**
Fasting blood sugar		
Hyperglycemia	53	**51.00**

Continued

Hypoglycemia	7	7.00
Normal blood sugar	20	20.00
Blood sugar not achieved	22	22.00
Glycated hemoglobin		
Not carried out	50	**48.07**
Normal HbA1C	24	23.08
Elevated HbA1C	30	28,85
Lipidogram according to male patients		
Total Cholesterol	13	12.90
Low HDL-c level	4	**64.52**
Low LDL-c level	17	**16.13**
Hyper Triglyceridemia	44	41.94
Lipidogram according to female patients		
Total Cholesterol	16	15.00
Low HDL-c level	4	**75.00**
Low LDL-c level	19	18.18
Hyper Triglyceridemia	45	42.86

Source: Medical file.

glycated hemoglobin was elevated in 29% of patients. The Lipidogram carried out in male patients found: a low HDL-c level in 64.52%, hyper triglyceridemia in 41.94% of cases. The lipidogram of female patients showed: a low HDL-c level in 75% of cases, hypertriglyceridemia in 42.86% of patients.

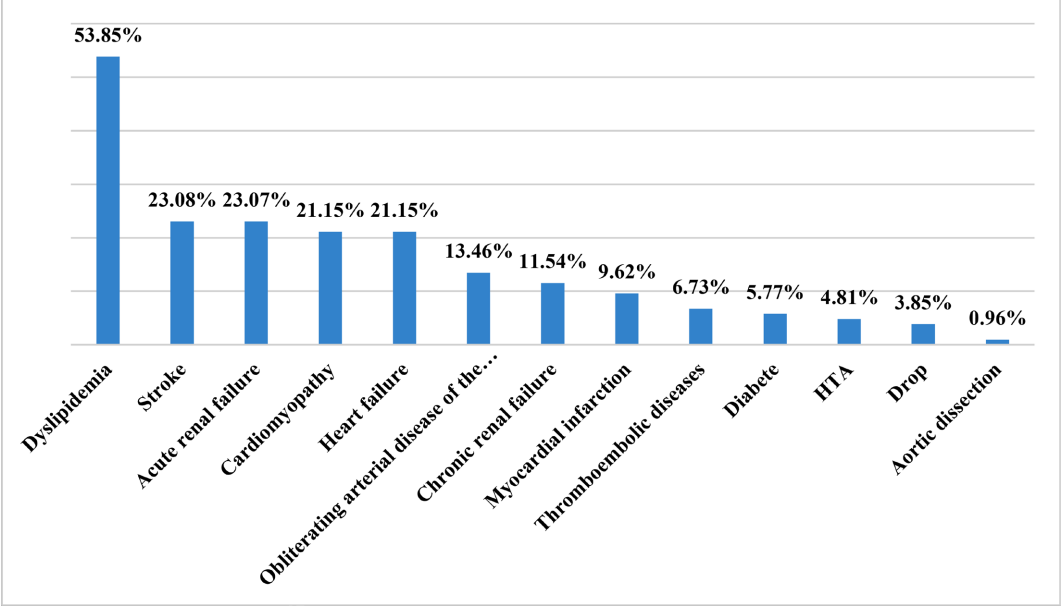


Figure 5. Distribution according to the main complications.

Complications were dominated by dyslipidemia with a frequency of 53.85%, followed by stroke and acute renal failure with a frequency of 23% each.

4. Discussion

A total of 104 patients were included, 61 women or 58.65% and 43 men or 41.35% (**Figure 1**), with a sex ratio of 0.70. Our result is similar to that of Raharinavalona with a female predominance of 53.88% and a sex ratio of 0.86 [10] in a type 2 diabetic population (harmonization FID 2009), the same observation was made by Laraqui with a frequency of 21.7% [11]. The average age in our series was 63.00 ± 11.44 years, with extremes ranging from 30 to 98 years. The predominant age group was that of 60 to 69 years with a frequency of 48.78% (**Figure 2**). The same observation was made by BA in Senegal with an average age of 63.3 years [12], Alkassan found a lower result than ours with a frequency of 31.51% in the age group of 50 to 70 years [13]. This result is supported by numerous studies which show an increase in the prevalence of metabolic syndrome with age. Housewives were the most affected with a rate of 41.23% (**Table 2**). This situation is explained by the sedentary lifestyle led by women in general and in particular those who have no other activity than the household and by the lack of income to afford a healthier diet. The main antecedents found were: diabetes with 80.77%, followed by hypertension 79.81% and dyslipidemia with 53.85% (**Table 3**). This result is slightly higher than that of Laraqui who observed a frequency of 12.8% [11]. Tobacco is defined in numerous studies as an important risk factor in the occurrence of cardiovascular events [3]. Visual blurring was present in 23.08% of cases, followed by dyspnea on exertion with 22.12% (**Table 4**). These clinical signs speak in favor of complications in the eyes and heart. In our series, 34% of our patients presented moderate obesity and 31% were overweight, either a cumulative rate of 71% above normal (**Figure 3**). Laraqui observed 53.4% of overweight patients [11]. Waist circumference was high in 39.53 of the male patients with an average of 104 ± 11.04 cm against 37.70% for the female patients (average = 100 ± 15.22 cm) **Figure 4**. These data remain consistently high in more than half of our patients. In our study, out of 41 patients who performed an ECG. 55.77% presented a sinus rhythm, an LVH was found in 4.81% which is predictive of some complications. 68% of patients with a cardiac ultrasound had retained LVEF. Hyperglycemia was found in 51% of patients due to the fact that the majority of patients had diabetes as a history and did not follow an appropriate diet. Elevated glycated hemoglobin (HbA1C) levels were found in 29% of cases. Low HDL-c was the predominant dyslipidemia in patients of both sexes, 75% in women and 64.52% in men (**Table 5**). HDL-cholesterol has a vascular protective effect against the development of atherosclerosis. The FRAMINGHAM study was one of the first prospective studies to show the inverse relationship between HDL-cholesterol and cardiovascular disease [14]. The European PROCAM study also demonstrated a very significant decrease in coronary risk as the value of HDL-cholesterol increased, with a

risk 3 times higher in subjects whose HDL-cholesterol was less than 0.35 g/l than that of subjects whose level was greater than 0.35 g/l [15]. Elevated triglyceridemia levels were observed in 42.86% of women and 41.94% of men (**Table 5**). Overall lipid abnormalities are observed more in women than in men, this situation could be explained by the sedentary lifestyle in women and especially by fleeing as age advances. In our series, complications were dominated by dyslipidemia with a frequency of 53.85% (**Figure 5**). This could be explained by the fact that they are the starting point of cardiovascular complications. Stroke and acute renal failure followed with a frequency of 23% each (**Figure 5**). Heart failure and cardiomyopathy were found in 21.15% of cases each (**Figure 5**). This result proves that the metabolic syndrome constitutes a true precursor in the occurrence of cardiovascular events and emphasizes the need to implement all means to prevent these complications.

However, our study had many limitations, namely:

- The small size of the sample.
- The difficulty of collecting anthropometric data in bedridden patients (unconscious and bedridden).

5. Conclusion

Metabolic syndrome is the combination of different metabolic and hemodynamic factors into a single entity that dramatically increases the risk of type 2 diabetes and/or cardiovascular disease. The female sex and the elderly are the most affected. Diabetes, hypertension, obesity and dyslipidemia are the most common personal histories. The metabolic syndrome remains a real public health problem, constantly increasing in our populations and constitutes a danger both in terms of its constituent elements and its complications. Its management primarily involves prevention through adopting a healthy lifestyle and treating people at high risk.

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Conflicts of Interest

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

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