

## Hypertension Study in Non-Pregnant Women in the Cardiology Department of the University Hospital Gabriel Touré (UH-GT), Bamako (Mali)

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### ABSTRACT

**Introduction:** Little data are available on female hypertension in our context, motivating the realization of this study to determine its prevalence and the associated electro- and echocardiographic abnormalities.

**Methodology:** We conducted a cross-sectional study over 6 months in the cardiology department of the CHU-GT by including patients aged 18 years and over seen in consultation and in whom the diagnosis of hypertension was made. All patients consented to participate in the study after information on the study and the absence of prejudice in the event of refusal. Data collection was carried out by observing the rules of confidentiality on a form then the data were inserted into an Access database and their analysis carried out by IBM SPSS version 20. The quantitative data are presented as means with standard deviation and the qualitative data as proportions. The level of significance of the tests was set at 5%.

**Results:** The prevalence of female hypertension was 61.8% of consultations. The means for age and body mass index were  $52 \pm 14.461$  years and  $27.35 \pm 06.585$  kg/m<sup>2</sup>, respectively. The main electrocardiographic abnormalities were dominated by left ventricular hypertrophy (LVH) and sinus tachycardia in 93.6 and 46.4% of cases, respectively. On the echocardiographic level, LVH, reduced ejection fraction and relative wall thickness were found in 41.05, 37.35 and 21.91%, respectively.

Left ventricular mass and ventricular geometry were abnormal in 44.4 and 37.3% of cases. Remodeling was the most common geometric abnormality with 18.2% and type II mitral flow with 90.2% the most common relaxation abnormality.

**Conclusion:** Female hypertension is common with electrical and echocardiographic changes including LVH and new younger patients, hence the need for an intensification of preventive measures, particularly life style and dietary measures, which do not require large financial resources.

## Keywords

Hypertension, Women, ECG, Echocardiography, Mali.

## Introduction

Cardiovascular diseases (CVD) accounted for 32% of the causes of death worldwide in 2019 [1] and approximately 523 million people are affected [2]. High blood pressure (HBP), the main risk factor for these CVDs, is a real public health problem [3-6]. HBP affects both men and women with variable prevalences reaching 83% in some studies [7-9]. The prevalence of female HBP in Africa reached 46.8% in Nigeria and approximately 14% in Kenya [10]. There are data in the African literature on HBP during pregnancy [11]. In our context hypertensive disorders have also been the subject of numerous unpublished theses on HBP and pregnancy. But few data are available on HBP in non-pregnant women, motivating this work aiming to study female HBP.

## Methodology

This was a cross-sectional study performed in the Cardiology department of the UH-GT from November 2022 to April 2023. Any non-pregnant woman aged at least 18 years old with a diagnosis of HBP was included. This inclusion was made on the basis of informed consent.

### Definition of terms:

Hypertension was defined as systolic blood pressure (SBP)  $\geq$  140 mmHg and/or diastolic blood pressure (DBP)  $\geq$  90 mmHg or patient on antihypertensive treatment. Electrical LVH was assessed by the Sokolow index (SV1 + RV5 or V6  $\geq$  35 mV) and the Cornell voltage index (SV3 + RaVL  $>$  20 mV). Echocardiographically, left ventricular mass and relative wall thickness were calculated and LVH was defined as indexed LV mass  $>$  120 g/m<sup>2</sup>.

Data collection, respecting confidentiality rules, was performed on a survey form and the data were entered into an Access database and analyzed using IBM SPSS software. Quantitative data are presented as mean with standard deviation and qualitative data as proportions. The significance threshold of the tests was 0.05.

## Results

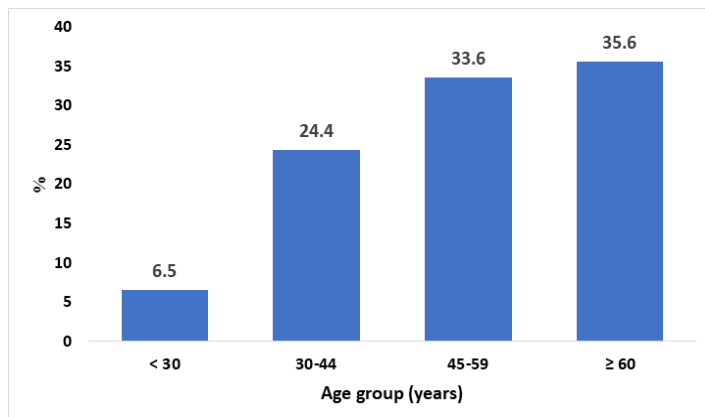
The sample consisted of 324 patients, 54% of whom were new patients. The mean age was  $51.95 \pm 14.461$  years ( $54.88 \pm 13.631$  for the old and  $49.46 \pm 14.716$  for the new,  $p < 0.001$ ). Height, weight and BMI with respective means of 163.60 6.452, 73.26 18.095 and 27.45 6.585 did not present a statistically significant difference between old and new patients. The p values were respectively 0.249, 0.846 and 0.622 (Table 1).

**Table 1:** Distribution of anthropometric characteristics according to hypertension status in the sample of 324 non-pregnant women.

Patient type	Age (years)		Height (cm)		Weight (Kg)		BMI** (Kg/m <sup>2</sup> )	
	Mean	SD*	Mean	SD*	Mean	SD*	Mean	SD*
Old patients	54,88	13,631	163,15	6,763	73,47	17,357	27,55	6,013
New patients	49,46	14,716	163,98	6,168	73,08	18,748	27,19	7,049
Total	51,95	14,461	163,60	6,452	73,26	18,095	27,35	6,585
P	<0,001		0,249		0,846		0,622	

Standard deviation \*\* Body mass index

The overall prevalence of hypertension was 61.8% of consultations. It increased from 6.5 in the  $< 30$  years age group to 35.5% for those  $> 60$  years (Diagram 1).



**Diagram 1:** Hypertension frequency in relation to age group in the sample of 324 non-pregnant women in the University Hospital Gabriel Touré (UH-GT).

The prevalences were significantly higher in patients up to 44 years old for new consultations (8 and 30.9% versus 4.7 and 16.8% respectively for those  $< 30$  and 30-44 years old). They were also significantly higher in the age groups 45 years and older for the old consultations (36.2 and 54.8 versus 31.4 and 29.7 respectively for the age groups 45-59 and  $\geq 60$  years (Table 2).

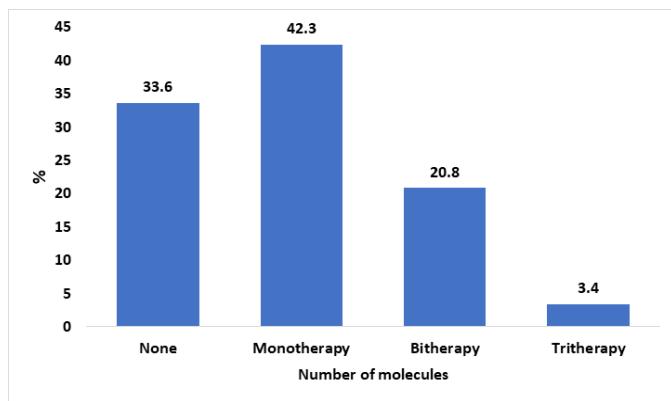
**Table 2:** Age group distribution according to hypertension status in the sample of 324 non-pregnant women.

Patient type	Age group (years)			
	< 30	30-44	45-59	$\geq 60$
Old patients	4,7	16,8	36,2	54,8
New patients	8	30,9	31,4	29,7

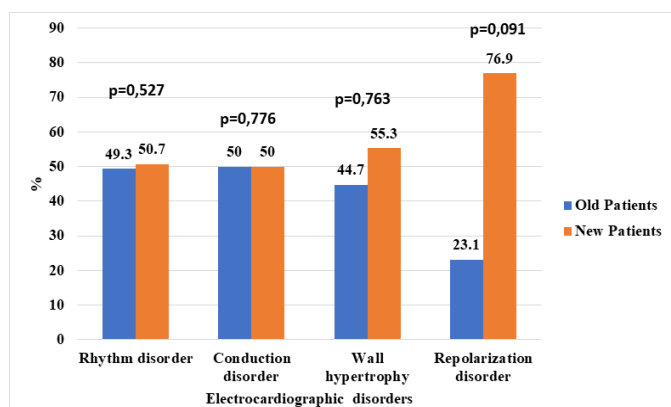
$p=0,007$

Regularity in consultations and in treatment monitoring was 31.8 and 20.4% respectively. The majority of the old patients were on monotherapy with 42.3% (Diagram 2).

Repolarization disorders and wall hypertrophy were found in 76.9% and 55.3% in the new patients (Diagram 3). Hypertrophy was dominated by left ventricular hypertrophy (LVH) in 93.6% of cases. Conduction disorders were dominated by left bundle branch block (LBBB) in 45.4%.

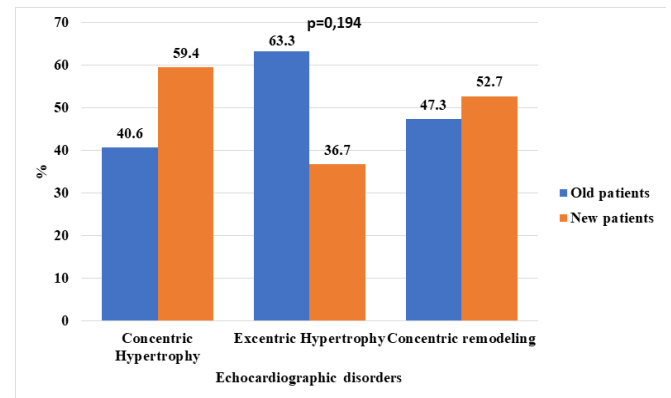


**Diagram 2:** Distribution of old patient medication number in the sample of 324 non pregnant women in the University Hospital Gabriel Touré (UH-GT).



**Diagram 3:** Distribution of electrocardiographic disorders in the sample of 324 non-pregnant women in the University Hospital Gabriel Touré (UH-GT).

Ventricular mass and geometry left were abnormal in 44.4 and 37.3%. An abnormality of the relative thickness of the wall and the reduction of the LVEF was found in 41.05 and 37.35%. The eccentric hypertrophy was more found in the old patients (63.3 against 36.7%) while the concentric hypertrophy was in 59.4 in the new patients against 40.6% with a value of  $p = 0.194$  (Diagram 4).



**Diagram 4:** Distribution of echocardiographic disorders in the sample of 324 non-pregnant women in the University Hospital Gabriel Touré (UH-GT).

## Discussion

This study on female hypertension on a relatively large number of people allowed us to make the following observations that sparked discussion.

In this study, the prevalence of female hypertension was very high with 61.8% of consultations and an upward trend was observed with increasing age. This high prevalence could be explained by menopause [12], various factors including oral contraception and hormonal treatments for menopause [13,14]. It can even be considered underdiagnosed according to Atakte [15] for reasons of accessibility according to Nunu [16] and also the underrepresentation of women in clinical trials [17]. In the literature, prevalences vary considerably [10,18], a variation that can be explained by the composition of the sample. Although this prevalence is generally less frequent than in male subjects, it increases after menopause and even exceeds that of men from the 7th decade [19].

We observed that new hypertensives were younger (Table 2), thus increasing the risk of developing complications of hypertension. The problem of adherence to treatment is also found in this study with only nearly a third of patients being followed regularly. This is consistent with data from the literature with approximately 76% of non-control according to Mounier-Vehier et al. [20], 52.7% according to Okello [21]. HBP would even be less well controlled at advanced ages [22,23]. Female hypertension was accompanied by certain electrical and echocardiographic changes, the most important of which was left ventricular hypertrophy and increased muscle mass and eccentric hypertrophy in former patients. Changes that can be explained by pathophysiology with the impact of chronic hypertension on the myocardium, which must adapt to it. It is known that LVH and left ventricular mass are positively correlated with the value of systolic blood pressure [24] and its demonstration depends on the populations studied [25]. Similarly, LVH is highlighted in nearly 40% of cases in patients not presenting electrical LVH [26] and the sensitivity of the ECG to detect LVH would be of the order of 50% according to Devereux [27]. Target organ damage (TOD) would be more frequent in male subjects [28].

## Limitations

We were unable to determine the overall cardiovascular risk of female patients due to the difficulties in carrying out the biological assessment, particularly cholesterol.

## Conclusion

Female hypertension is frequent with electrical and echocardiographic changes including LVH and new younger patients, hence the need for an intensification of preventive measures, particularly hygiene and dietary measures, which do not require large financial resources.

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