

# Prevalence and Association of Obesity and Arterial Hypertension in a Moroccan Population

Amine Kherraf <sup>a\*</sup>, Boutar Ould Mohamed Sidi <sup>a</sup>, Brigitte Esther Ovaga <sup>a</sup>,  
Majda Haraka <sup>a</sup>, Ghali Bennouna <sup>a</sup>, Leila Azzouzi <sup>a</sup> and Rachida Habbal <sup>a</sup>

<sup>a</sup> Department of Cardiology, University hospital of Ibn Rochd, Casablanca, Morocco.

## Authors' contributions

*This work was carried out in collaboration among all authors. All authors read and approved the final manuscript.*

## Article Information

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## ABSTRACT

The aim of the study is to report the prevalence of the association of obesity and arterial hypertension as well as the epidemiological and clinical aspects in obese hypertensives in Moroccan hospitals. This was a descriptive retrospective study conducted over a period of 2 years in the cardiology department of CHU Ibn Rochd. It concerned the subjects, known hypertensives, followed in the service during the study period. 227 hypertensive patients followed during this period: 182 women (80.17%) and 45 men (19.82%), average age in both sexes of 61.12 + 13.5 years (extremes: 34 to 87 years). Systolic hypertension was most frequently reported. Median blood pressure was 142.03 mmHg systolic and 77.43 mmHg diastolic. Obesity was the most common risk factor associated with high blood pressure with a frequency of 39.46%. The symptom most reported by patients was dyspnea on exertion (11.01%). Left ventricular hypertrophy was present in 10.13% of cases. This study revealed a high prevalence of arterial hypertension in obese people at the CHU Ibn Rochd in Casablanca.

**Keywords:** *Overweight; obesity; high blood pressure.*

## 1. INTRODUCTION

The progression of obesity in the world is largely responsible for the arterial hypertension (HTA)

more frequently associated with this condition [1]. Arterial hypertension is a major public health problem in developing countries. it would affect 10 to 15% of the adult population in the Maghreb

\*Corresponding author: Email: [kh90\\_amine@hotmail.com](mailto:kh90_amine@hotmail.com);

[2,3]. Several studies have shown that obese people, compared to non-obese people, were still affected by other pathologies such as high blood pressure, diabetes, coronary heart disease, etc. [4],[5] thus posing a real public health problem.

This retrospective study conducted in a hospital environment, at the CHU IBN ROCHD (Casablanca), with the aim of studying the relationship between BMI and arterial hypertension in a Moroccan population.

## 2. PATIENTS AND METHODS

This was a descriptive retrospective study, by documentary review, carried out over a period of 2 years as part of a regular annual follow-up of hypertensive patients, including 227 patients, followed in the Cardiology department of CHU Ibn Rochd of Casablanca.

### 2.1 Procedure and Collection Tools of the Study

The collection of data consisted of an exploitation of patient files. The data was collected using a data collection sheet which included all the variables on hypertension. Sociodemographic, clinical, therapeutic data, cardiovascular risk factors were collected during an individual interview coupled with the measurement of constants. the existence or not of associated chronic pathologies such as diabetes and

dyslipidemia. The BP was taken with a validated automatic electronic self-measurement device, after resting for a few minutes, in a sitting or lying position. The scales were calibrated, with one kg graduation needle dials. The Body Mass Index (BMI) is calculated from weight and height measured in a standardized way in all patients, represented in Kg/m<sup>2</sup>.

The population was divided into 4 groups: group (1) had a BMI <18.5, group (2) 18.5≤BMI<25, group (3) 25≤BMI<30, group (4) BMI ≥30.

### 2.2 Sampling

All patients who presented during the study period and who met the inclusion criteria were retained.

### 2.3 Operational Definitions

- 1) HTA: The determination of blood pressure was carried out in accordance with WHO recommendations (Table 1) [6] Arterial hypertension was defined as the presence of either antihypertensive treatment or a blood pressure greater than or equal to 140/90 mmHg. 2) BMI is calculated by dividing the subject's mass by the square of their height, according to the WHO classification of obesity [7] Table 2.

**Table 1. Classification of hypertension according to the WHO**

Category	PAS (mmHg)	PAD (mmHg)
optimal	<120 and <80	
Normal	120-129 and /or 80-84	
normal high	130-139 and /or 85-89	
HTA grade I	140-159 and /or 90-99	
HTA grade II	160-179 and /or 100-109	
HTA grade III	≥180 and /or ≥110	
Isolated systolic hypertension	≥140 and <90	

**Table 2. WHO classification of obesity**

BMI	Classification
<18,5	Underweight
18,5–24,9	regular weight
25,0 à 29,9	overweight
30,0 à 34,9	Class I obesity
35,0 à 39,9	Class II obesity
≥ 40,0	Class III obesity

## 2.4 Statistical Analysis

A simple descriptive analysis was carried out on the entire study population. The results are expressed in frequency for the qualitative variables or in mean + standard deviation for the quantitative variables. The estimation of the prevalence of hypertension and of the average results in the population was made by adjusting the data for sex, with a statistical confidence level of 5%. Pearson's chi-square test and Fisher's exact test were used for comparison of percentages. Statistical significance was reached when  $p < 0.05$ .

## 3. RESULTS

A total of 227 people were followed for hypertension during the study period; Our study population was predominantly female with 182 women and 45 men, respectively 80.17% and 19.82% and a sex ratio of 4.04. The median age of our Study population was 61.12 years old (range 34 and 87 years old) (Fig. 1).

The majority of patients were uneducated. 26 patients (11.50%) in our study still had a professional activity.

### 3.1 Prevalence and Clinical Characteristics of Hypertension

Median systolic blood pressure was 142.03 mmHg and diastolic blood pressure 77.43 mmHg. Systolic hypertension was the most frequently reported. The classification of hypertension according to the different grades is reported in Table 3. Obesity was the risk factor most frequently associated with hypertension (90 patients or 39.46%). The other risk factors were diabetes (87 patients or 38.32%), dyslipidemia (82 patients or 36.12%), smoking (15 patients or 6.60%), renal failure (13 patients or 5.72%), alcohol consumption (05 patients or 2.20%), The most frequently reported symptom was exertional dyspnea (25 patients or 11.01%).

Left ventricular hypertrophy was present in 23 patients (10.13%).

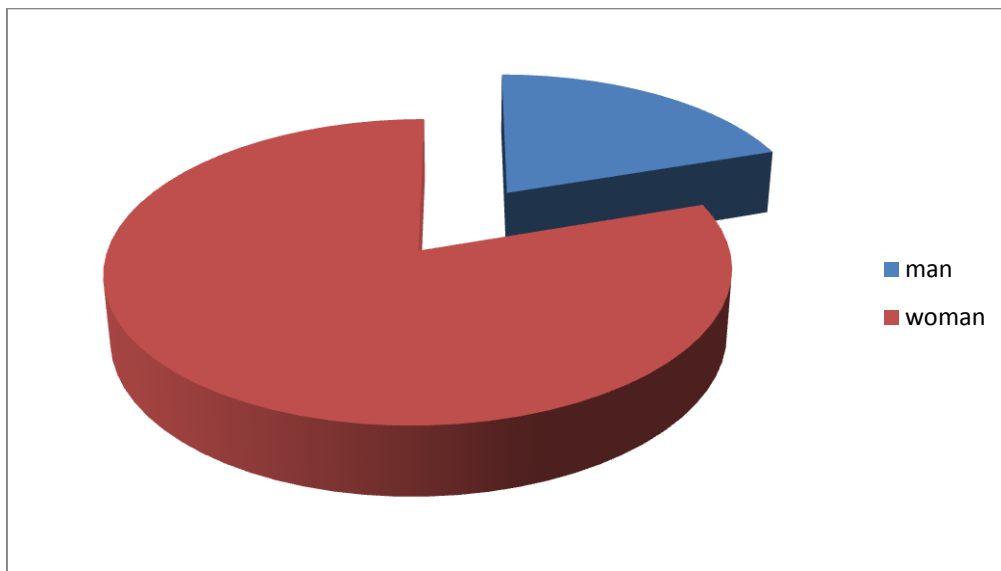
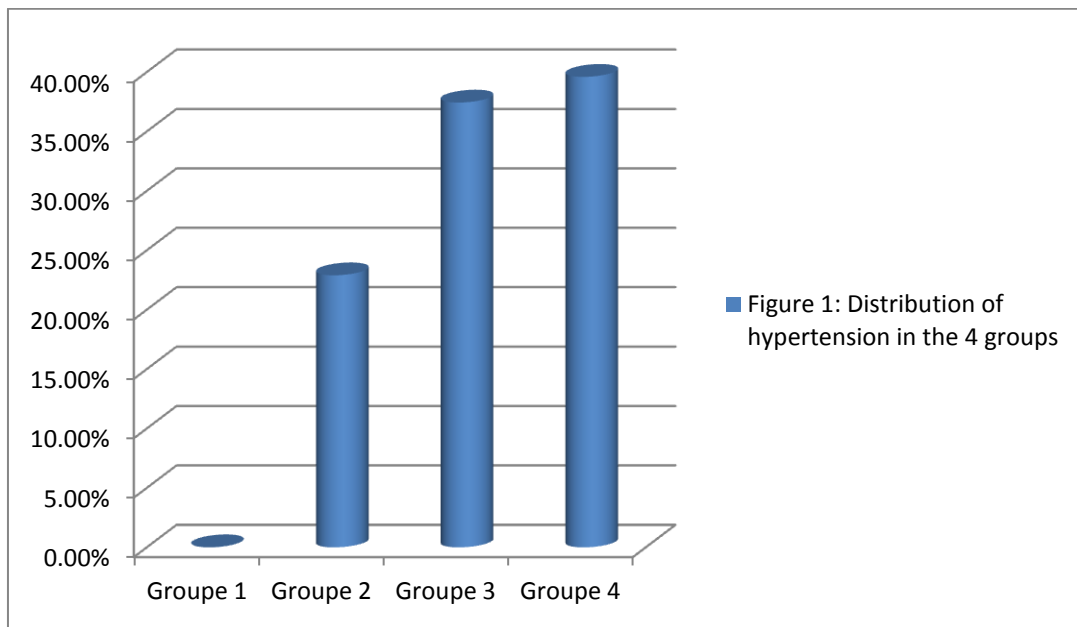


Fig. 1. Distribution of patients by gender

Table 3. Distribution of patients according to hypertension grade

Grade of hypertension	Workforce(n)	Percentage(%)
Grade I	168	74
Grade II	32	14,09
Grade III	27	11,89
Systolic hypertension	96	42,29



**Fig. 2. Distribution of hypertension in the 4 groups**

### 3.2 Distribution of Hypertension in the 4 BMI Groups

In group [I] hypertension represented 0% of our patients, group [II] 52 patients (i.e. 22.9%), group [III] 85 patients which represents patients with overload (i.e. 37.44%), group [IV] represents obese with 90 patients (ie 39.6%) (Fig. 2).

## 4. DISCUSSION

During this study, we observed a female predominance 182 patients (80.17%), 45 men (19.82%) with a sex ratio of 4.04 in favor of women. This result was observed by J. MARTIONI [8] who found a female/male ratio of 2.64. This seems more consistent with African demography characterized by a higher life expectancy among women.

The association of hypertension, obesity and other risk factors increases the overall cardiovascular risk in this subpopulation.

Obesity is considered a well-known modifiable risk factor as well as Arterial hypertension [9].

Obese people are more likely to be hypertensive than lean patients, indeed weight gain (increased BMI) is closely correlated with the increased incidence of arterial hypertension [10,11]. Obesity was the most frequently associated risk

factor (90 patients or 39.46%) Diabetes was the second risk factor after obesity (87 patients or 38.32%).

These two pathologies associated with hypertension in 77.97% of cases in the population of our study, contribute to the increase in cardiovascular risk.

## 5. CONCLUSION

Hypertension remains a major public health problem, its incidence is strongly correlated with the increase in BMI, indeed obese subjects are exposed to a high cardiovascular risk.

## CONSENT

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

## ETHICAL APPROVAL

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

## COMPETING INTERESTS

Authors have declared that no competing interests exist.

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