

# Prevalence, Awareness, Treatment and Control of Hypertension in Tshela Rural Areas. Democratic Republic of The Congo

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**Abstract-** BACKGROUND AND AIM: Order to plan by the authorities in our country with limited resources, we have a study to assess the prevalence, awareness, control and factors associated with hypertension in rural Tshela, located in the southern part western DRC

**METHODS:** we conducted a cross-sectional study using a modified WHO STEP wise questionnaire for data collection during face-to face interviews was conducted from October, 1 to December 15, 2018. A multistage cluster sampling method was used and inclusion criteria were age  $\geq 18$  years and informed consent. Information on demographic parameters, behavioral lifestyles, anthropometric and blood pressure (BP) measurements was obtained. Hypertension was defined as an average of two BP  $\geq 140/90$  mmHg or self-reported history of antihypertensive medication use. Independent factors associated with hypertension were identified using logistic regression analysis.  $P < 0.05$  defined the level of statistical significance.

**RESULTS:** The prevalence of hypertension was 34.5% with 56,1 % of hypertensive participants being unaware of their hypertension status. Of those who were aware and on treatment, only 22, 6% had a controlled BP. Older age ( $p < 0.001$ ), ATS ( $p < 0.001$ ) and DS ( $p < 0.001$ ) emerged as main cardiovascular risk factors associated with hypertension.

**CONCLUSION** we reported high prevalence, low awareness and suboptimal BP control, high cardiovascular risk and associated with smoking and obesity as modifiable risk factors. Therapeutic lifestyle changes and pharmacological treatment are necessary for hypertensive participants.

Hypertension was characterized by a high prevalence, low rate of awareness and suboptimal BP control, high cardiovascular risk and associated with smoking and obesity as modifiable risk factors. Therapeutic lifestyle changes and pharmacological treatment are needed for those hypertensive participants with increased global cardiovascular risk.

**Index Terms-** hypertension, prevalence, awareness, tshela

## I. INTRODUCTION

Hypertension is a major risk of disease risk 1. according to the World Health Organization estimates that approximately 40% of adults suffer from hypertension<sup>2</sup>. he is responsible Each year, 9.4 million deaths from complications either from heart disease or from stroke (BP) <sup>3, 4</sup>.

The literature reports a gradual increase in the global prevalence of hypertension due to an aging population, the adoption of an unhealthy lifestyle <sup>5</sup>. Hypertension being the risk factor contributing the most to the burden of disease, the importance prevention, diagnosis and adequate control of hypertension is more than ever emphasized. Globally, however, less than half of all people are aware of their diagnosis and less than a third of people on treatment have controlled BP<sup>6,7</sup>.

n sub-Saharan Africa (SSA), its prevalence can reach 38% in certain communities <sup>8,9</sup>. but it is estimated that between 10 and 20 million can suffer from hypertension. These estimates are based on estimates as many sub-Saharan African countries still lack recent and detailed baseline data on the prevalence of HTN <sup>10</sup>. In addition, few available studies report low awareness, low rates of patients on treatment and a low rate of hypertensin control in these populations.

In our country the Democratic Republic of Congo (DRC), the nationwide prevalence of hypertension and associated risk factors is not yet available due lack of an effective nationwide surveillance system and financial constraints; however, studies conducted in some urban and rural areas have reported a prevalence of hypertension ranging from 30% to 40% and an increased CV mortality due, among others, to low awareness, under-diagnosis and under-treatment as well as poor hypertension control<sup>11-14</sup>. If studies have been conducted in port cities like Kinshasa, Bukavu, Matadi and Boma, there is no data yet available on hypertension and risk factors associated with Tshela, DRC

## II. METHODS

- Study design

We conducted a cross-sectional study based on a randomly selected adult population

- Study setting

Tshela is a City located at 250 Km far from Matadi, the Capital City of the south western Province of Kongo Central and 690 Km far Kinshasa, the Capital City of DRC.

Study population

A multistage stratified sampling method was used to allow estimates by sex (male and female) and residence (urban and rural). A total of 1000 eligible individuals were successfully interviewed among the households that gave informed consent.

- Inclusion criteria

Was included in this study any person over the age of 18, having resided in Tshela over 1 year and having consented verbally or in writing.

- Data collection

The relevant parameters including socio-demographic data, anthropometric and behavioral measures were obtained after the interview by trained personnel..

### Measures

The anthropometric measurements (such as body weight, waist circumference, height) blood pressure, and pulse rate were collected by well-trained Medical students. Blood pressure was measured using digital blood pressure meters (OMRON MIT5 Connect, Kyoto, Japan). The average of the two measures was used in the final analysis.

The size was measured, in a standing position, in a participant without shoes, using a flexible measuring tape (Hemostyl, Sulzbach, Germany). Body weight was also measured with individuals wearing light clothing or standing without shoes using a digital weighing scale (Deluxe GBS-721; Seca Deutschland, Hamburg, Germany). Body mass index (BMI) was computed as weight in kilograms divided by height in meters squared ( $\text{Kg}/\text{m}^2$ ). A flexible measuring tape was used to measure the size at the level connecting the two iliac crests.

During the survey, questionnaires on eating habits, risky behavior (smoking and smoking, lack of consumption of fruits and vegetables) and physical activities were administered.

- Operational definitions

The socio-economic level was calculated on the basis of DRC Demographic and Health Survey (DHS) and classified into three degrees : low, middle and high socioeconomic status (SES)<sup>15</sup>. The cardiovascular risk factors were defined according to the surveillance manual<sup>16</sup>. Talking alcohol was defined as consumption of more than 1 standard drink (which is the amount of alcohol you find in a small beer, one glass of wine, or one tot of spirits per day for females and more than 2 standard drinks for males)<sup>16</sup>. Smoking was defined as the frequent use of tobacco in all forms (smoked, prized)<sup>18</sup>. The BMI was further classified into four categories; underweight (BMI <18.5  $\text{Kg}/\text{m}^2$ ), normal (BMI 18.5-24.99  $\text{Kg}/\text{m}^2$ ), overweight (BMI 25 -29.99  $\text{Kg}/\text{m}^2$ ) and obese (BMI  $\geq 30$   $\text{Kg}/\text{m}^2$ )<sup>19</sup>. Diabetes was defined as currently taking antidiabetic drugs or having a fasting capillary whole blood glucose value  $\geq 126$   $\text{mg}/\text{dL}$ <sup>20</sup>. Hypertension was defined as a BP

$\geq 140/90$  mm Hg, hypertensive subjects was defined by self-reporting ongoing treatment<sup>21</sup>. The hypertension was defined as controlled when SBP < 140 mmHg and DBP < 90 mmHg under pharmacological treatment. Low fruit/vegetable consumption of less than 5 portions of fresh and/or cooked fruits/vegetables a day<sup>22</sup>. Insufficient physical activity was defined as self-reported less than 150 min of moderate intensive activity or less than 75 min vigorous intensive physical activity per week, including walking and cycling<sup>23</sup>.

### Data analyses

Data were analyzed using Statistical Package for the Social Sciences (SPSS) version 21 for Windows (SPSS Inc., Chicago, IL, United States). Data were expressed as mean values  $\pm$  standard deviations (SD) for continuous variables. Frequencies (n) and percentages (%) were reported for categorical variables. Counts (frequency = n) and percentages (%) were reported for categorical variables. Percentages were compared using the chi-square test. The logistic regression model analysis adjusted for obesity, physical activity, dietary practices, parity, income and alcohol use. A p-value of < 0.05.

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### Ethical approval

Obtained from the Ethical Committee of the Ministry of Health (N°150/CNES/BN/PMMF/2019). Consent was taken from the subjects who volunteered to participate in the study. Identified hypertensive subjects were referred to the nearby clinic for treatment

## III. RESULTS

### Table 1. General characteristics

Of the 1000 participants, 372 (37.2%) were males while 628 (62.8%) were females. Their mean age was  $47,7 \pm 16,0$  years with 34,9%, 21,6%, 19,6% and 23,9 % participants aged participants aged respectively < 40 years, 40–49 years, 50-59 years and  $\geq 60$  years . The proportion of unemployed, married, single, secondary education level and low SES participants was 39.7%, 70.1%, 8.9%, 51.1% and 61.4%, respectively. Average levels of SBP, DBP, HR, BMI, WC, and capillary blood glucose were  $127,2 \pm 22,9$  mmHg,  $78,7 \pm 15,7$  mmHg,  $80,3 \pm 10,6$  bpm,  $23,5 \pm 4,9$   $\text{Kg}/\text{m}^2$ ,  $81,7 \pm 11,9$  cm and  $118,1 \pm 31,1$   $\text{mg}/\text{dl}$ , respectively. Table 2 summarizes cardiovascular risk factor profile of the study population as a whole and by BP categories. In the study population as a whole, Smoking 21.5%, alcohol intake (31.3%), obesity (11.0%), central obesity (38.1%) and low Fruits and

vegetables consummate (71.1%) were cardiovascular risk factors most frequently reported by the participants.

- Prevalence and Awareness, treatment and control of hypertension

Hypertension was observed in 345 (34.5%) participants (Fig.1),

Of the 345 hypertensive patients, 144 (41.7%) knew each other hypertensive and among them heard there were more women. were aware (45.5% vs 37.9%;  $p < 0.001$ ) (Table 3). Current pharmacologic antihypertensive treatment was reported by 62 (85.4%) of 144 participants aware of their hypertension status. The antihypertensive regimen was based on 1 and 2 antihypertensive drugs in 53 (72.8%) and 9 (14.6%) treated hypertensive participants, respectively; no participant was receiving  $\geq 3$  antihypertensive drugs.

In those receiving one antihypertensive drug, calcium channel blockers (50.9%) was the drug class most frequently reported by participants whereas the combination of calcium channel blockers (CCB) and angiotensin converting enzyme inhibitors (ACEIs) (49.1%). BP control was observed in 14 (22.6%) of 144 treated hypertensive participants mainly in men than women (34.8 vs 12.1;  $p = 0.001$ ).

#### Factors associated with hypertension

In univariate analysis (Table 3), cardiovascular risk factors significantly associated with hypertension were older age ( $p < 0.001$ ), smoking ( $p < 0.001$ ), menopause ( $p < 0.001$ ) ATS ( $p < 0.001$ ), Overweight ( $p < 0.001$ ) obesity ( $p = 0.001$ ), and central obesity ( $p < 0.001$ ) emerged as the main cardiovascular risk factors significantly associated with hypertension. In multivariate analysis (Table 4), the strength of the associations observed in univariate analysis persisted only for older age [aOR 2,98(2,05-4,35);  $p < 0.001$ ], ATS [aOR 8,90(5,65-14,02);  $p < 0.001$ ] and obesity (aOR 2,68(1,92-3,17);  $p = 0.001$ ). Thus, the likelihood of having hypertension was nearly three-fold greater in the presence of older age (aOR 2, 8; 95% CI 2.98(2.05-4.35);  $p < 0.001$ )

#### IV. DISCUSSION

This study was conducted following the STEPS of the WHO on the assessment of risk for non-communicable diseases and associated factors in rural population. The study on hypertension, like the other studies carried out in the RDC, showed a high prevalence in the general population (35.5%)<sup>14</sup>.

The majority of previous studies report a higher prevalence of HNT in urban areas than in rural areas, because rural African populations have a traditional lifestyle associating cultural and dietary habits allowing prevention against of HNT, (38% in rural areas vs 41% in urban zones in 2014)<sup>12</sup> but Makoso et al. find a high prevalence in rural areas in 2020 in Boma (73.6%)<sup>14</sup>.

A similar prevalence has been reported from HTN in Nigeria, South Africa, Tanzania, Uganda and Ghana<sup>25-29</sup>. This prevalence will be explained by the progressive aging of the population and the increase in life expectancy in African countries. Age, BMI, sedentary lifestyle, smoking and alcohol consumption are the factors generally associated with hypertension. Most of them have already been identified as important risk factors for hypertension in different studies conducted in SSA<sup>30-34</sup>.

Our results corroborate those of the literature on some of these observed associations such as advancement in age, physical inactivity and BMI. Our study does not establish an association between smoking and hypertension, while tobacco is recognized as a risk factor for CVD

Increased age is one of the strongest risk factors for the development and progression of hypertension. Indeed, the ageing process can increase BP through several mechanisms including insulin resistance/ hyperinsulinemia and subsequent activation of the sympathetic nervous system and renin angiotensin aldosterone system, clustering of multiple risk cardiovascular risk factors, oxidative stress and subsequent inflammation and endothelial dysfunction, increased renal proximal tubular sodium and water reabsorption mediated by the activation of sodium-proton exchanger<sup>35,36</sup>. Like aging, overweight and obesity also can increase BP through insulin resistance/hyperinsulinemia and their subsequent hemodynamic, metabolic and renal consequences<sup>37</sup>. Alcohol consumption, a well-known risk factor for HTN, was not significantly reported in our analyzes<sup>21</sup>, while several studies in sub-Saharan Africa have established a positive association between HTN and moderate to heavy consumption of alcohol<sup>38,39</sup>. In our study, less than 58.2% of hypertensive participants were aware of their pathology and less than one-half of them took antihypertensive treatments.

The study shows that 1 in 3 patients has controlled hypertension with antihypertensive drugs, this observation is frequent in African studies<sup>8,11</sup>.

The proportion of participants aware, treated and controlled was low in the present study. Our finding is consistent with that of previous studies conducted in the Democratic Republic of the Congo<sup>11-14</sup>. Our finding of low proportion of participants aware of their hypertension is consistent with previous reports from our setting. In this regard, awareness rates of 32,5%, and 42.5% have been already reported by M'Buyamba-Kabangu et al. in Kinshasa, the capital City<sup>40</sup> and Katchunga et al. in Bukavu, a City located at the southern East part of DRC, respectively<sup>12</sup>. Low awareness remains still a big challenge for the control of hypertension in other sub-Saharan African countries and requires effective behavioral change communication and screening strategies to reduce the prevalence of undiagnosed hypertension and related life-threatening complications<sup>41,42</sup>.

The low proportion of participants on antihypertensive therapy in the present study is consistent with previous studies from DRC and other sub-Saharan African countries<sup>11-13</sup> that reported values less than 50% among treated patients. Similar picture has been found for patients who achieved recommended BP goals.

The majority of treated participants were receiving monotherapy with mainly calcium channel blockers. If the use a calcium channel blocker or a thiazide diuretic as first-line drug in the treatment of hypertension of blacks, known to have a low plasma renin activity and a subsequent volume-dependent hypertension<sup>43</sup>.

Older age and FH-HT as non-modifiable and smoking, overweight and obesity as modifiable risk factors were independent factors associated with hypertension. Older age has been reported to be one of the most powerful cardiovascular risk factors through oxidative stress-induced endothelial dysfunction<sup>36</sup>

and subsequent vascular remodeling as well as the coexistence of multiple cardiovascular risk factors via insulin resistance<sup>35</sup>.

The association of FH-HT and hypertension does translate the existence of a potential genetic susceptibility that does interact with environmental factors for the development and progression of hypertension and related end-organ damage<sup>44</sup>. Smoking<sup>45</sup> and overweight/obesity are well-known traditional risk factors sharing insulin resistance, sympathetic nervous (SNS) and renin angiotensin aldosterone (RAAS) systems, oxidative stress and subsequent inflammation and endothelial dysfunction as a common pathogenic pathway for cardiac and vascular damage<sup>46</sup>. The interpretation of the results of the present survey should take into account of some limitations. First, the cross-sectional design of the survey precludes the establishment of any temporal relationship between the outcome and the variables of interest. Second, the unique measurement of the variables of interest could have under- or overestimated their true values and the prevalence of hypertension. Third, other factors usually associated with hypertension such as blood lipids were not measured.

## V. CONCLUSION

The present survey showed that nearly four participants out of ten had hypertension that was associated with older age, family history of hypertension, overweight and obesity as main cardiovascular risk factors. A management strategy based on both therapeutic lifestyle changes (TLC) and pharmacological treatment is needed for those hypertensive participants with increased global cardiovascular risk.

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## CONFLICT OF INTEREST

No

## AUTHOR'S CONTRIBUTION

BMN participated in survey conception and data collection and management; drafted the manuscript.

GLL, BLB, MMN participated in survey conception and data analysis; revised the manuscript.

GLL conducted data analysis and revised the manuscript.

RV revised the manuscript.

JMN revised the manuscript.

EBK participated in survey conception and revised the manuscript

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#### ANNEXES

Table 1. General characteristics of the study population as a whole and by hypertension status.

Table 2. Cardiovascular risk profile of the study population as a whole and by hypertension status.

Table 3. Awareness, treatment and control of hypertension of the study population as a whole and by hypertension status.

Table 4. Cardiovascular risk factors associated with hypertension in univariate and multivariate analysis.

Figure 1. Distribution of study population according to blood pressure status.

**Table 1. General characteristics of the study population as a whole and by hypertension status.**

<b>Variables</b>	<b>Over All</b>	<b>Male</b>	<b>Female</b>	<b>P</b>
	<b>n = 1000</b>	<b>n=372</b>	<b>n=628</b>	
Age, years	47,7±16,0	49,4±15,4	46,7±16,3	<0.007
Age categories, n(%)				<0.001
< 40 years	349(34,9)	114(30,6)	235(37,4)	
40-49 years	216(21,6)	73(19,6)	143(22,8)	
50-59 years	196(19,6)	75(20,2)	121(19,3)	
≥60 years	239(23,9)	110(29,6)	129(20,5)	
Occupation, n(%)				<0.001
Senior Staff	30(3,0)	23(6,2)	7(1,1)	
Businessmen	351(35,1)	131(35,2)	220(35,0)	
Students	24(2,4)	15(4,0)	9(1,4)	
Public Servants	198(19,8)	124(33,3)	74(11,8)	
Unemployed	397(39,7)	79(21,2)	318(50,6)	
Marital status, n(%)				<0.001
Married	700(70,1)	295(79,3)	405(64,7)	
Divorced	70(7,0)	17(4,6)	53(8,5)	
Widow	139(13,9)	11(3,0)	128(20,4)	
Single	89(8,9)	49(13,2)	40(6,4)	
Education level, n(%)				<0.001
Primary/no	298(29,8)	56(15,1)	242(38,5)	
Secondary	510(51,1)	202(54,4)	308(49,0)	
University/Superior	191(19,1)	113(30,5)	78(12,4)	
SES, n(%)				0.113
Low	614(61,4)	220(59,1)	394(62,7)	
Middle	341(34,1)	126(33,9)	215(34,2)	
High	45(4,5)	26(7,0)	19(3,0)	
BMI, Kg/m <sup>2</sup>	23,5±4,9	22,2±3,6	24,2±5,5	<0.001

WC, cm	81.7±11.9	79.7±10.7	85.4±13.2	<0.001
SBP, mmHg	127,2±22,9	129,8±21,7	125,7±23,4	<0.006
DBP, mmHg	78,7±15,7	80,3±13,2	77,8±16,9	<0.012
MAP, mmHg	94,9±16,6	96,8±15,2	93,8±17,3	<0.005
PP, mmHg	48,5±16,6	49,4±13,5	47,9±18,1	<0.163
HR, bpm	80,3±10,6	78,4±12,4	81,4±9,2	<0.001
Blood glucose, mg/dl	118.1±31.1	118.2±31.9	117.9±29.7	0.929

Data are expressed as mean ± standard deviation, median (interquartile range) absolute (n) and relative (in percent) frequency. Abbreviations: M, male F, female SES, socioeconomic status BMI, body mass index WC, waist circumference SBP, systolic blood pressure DBP, diastolic blood pressure MAP, mean arterial blood pressure PP, pulse pressure HR, heart rate bpm, beat per minute

**Table 2. Cardiovascular risk factor profile of the study population as a whole and by hypertension**

<b>FRCV</b>	<b>HTA+</b> <b>n=345</b>	<b>HTA-</b> <b>n=655</b>	<b>p</b>
Age >55 H/45 F, n(%)	237(68,7)	208(31,8)	<b>&lt;0,001</b>
HF-HTA, n(%)	88(25,5)	167(25,5)	0,527
HF-DM, n(%)	51(14,8)	52(7,9)	<b>0,001</b>
HF-Obesite, n(%)	9(2,6)	20(3,1)	0,428
HF- MCV, n(%)	16(4,6)	11(1,7)	<b>0,007</b>
HF-MRC, n(%)	4(1,2)	5(0,8)	0,378
Smoking,, n(%)	93(27,0)	122(18,6)	<b>0,002</b>
Alcohol intake, n(%)	113(32,8)	200(30,5)	0,258
Physical inactivity, n(%)	114(33,0)	137(20,9)	<b>&lt;0,001</b>
Goutte, n(%)	12(3,5)	7(1,1)	<b>0,009</b>
Menopause, n(%)	142(41,2)	108(16,5)	<b>&lt;0,001</b>
ATS, n(%)	140(40,6)	32(4,9)	<b>&lt;0,001</b>
Overweight, n(%)	85(24,6)	106(16,2)	<b>0,001</b>
Obesity, n(%)	54(15,7)	56(8,5)	<b>0,001</b>
Central obesity, n(%)	175(50,7)	205(31,3)	<b>&lt;0,001</b>
RCM, n(%)	89(25,8)	94(14,4)	<b>&lt;0,001</b>

DM, n(%) 68(23,1) 58(11,5) <0,001

Data are expressed as absolute (n) and relative (in percent) frequency. Abbreviations: M, male F, female FH, family history HT, hypertension DM, diabetes mellitus CVD, cardiovascular disease PH, personal history CMR, cardiometabolic risk

**Table 2. Cardiovascular risk factor profile of the study population as a whole and by hypertension**

<b>FRCV</b>	<b>HTA+</b> <b>n=345</b>	<b>HTA-</b> <b>n=655</b>	<b>p</b>
Age >55 H/45 F, n(%)	237(68,7)	208(31,8)	<0,001
HF-HTA, n(%)	88(25,5)	167(25,5)	0,527
HF-DS, n(%)	51(14,8)	52(7,9)	<b>0,001</b>
HF-Obésité, n(%)	9(2,6)	20(3,1)	0,428
HF- MCV, n(%)	16(4,6)	11(1,7)	<b>0,007</b>
HF-MRC, n(%)	4(1,2)	5(0,8)	0,378
HF-Dyslipidémie, n(%)	4(1,2)	11(1,7)	0,712
Tabac, n(%)	93(27,0)	122(18,6)	<b>0,002</b>
Alcool, n(%)	113(32,8)	200(30,5)	0,258
Sédentarité, n(%)	114(33,0)	137(20,9)	<0,001
Goutte, n(%)	12(3,5)	7(1,1)	<b>0,009</b>
Ménopause, n(%)	142(41,2)	108(16,5)	<0,001
Athérosclérose subclinique, n(%)	140(40,6)	32(4,9)	<0,001
Tachycardie, n(%)	34(9,9)	81(12,4)	0,140
Surpoids, n(%)	85(24,6)	106(16,2)	<b>0,001</b>
Obésité, n(%)	54(15,7)	56(8,5)	<b>0,001</b>
Obésité abdominale, n(%)	175(50,7)	205(31,3)	<0,001
RCM, n(%)	89(25,8)	94(14,4)	<0,001
DS, n(%)	68(23,1)	58(11,5)	<0,001
Durée de sommeil, n(%)			<b>0,005</b>
<8 heures	148(44,0)	215(33,8)	
8 heures	118(35,1)	250(39,3)	
>8 heures	70(20,8)	171(26,9)	



Activité physique, n(%)			0,221
Inactif	196(56,8)	354(54,0)	
Actif	194(43,2)	301(46,0)	

**Table 3. Awareness, treatment and control of hypertension among hypertensive participants**

Variable	N	All	Male	Female	P
Awareness, n(%)	345		145	200	<0.001
No		201(58.2)	90(62.1.)	111(55.5)	
Yes		144(41.7)	55(37.9)	89(45.5)	
Treatment, n(%)	144		58	86	0.476
No		82(56.9)	32(55.2)	50(58.1)	
Yes		62(43.1)	26(44.8)	36(41.9)	
Drug regimen/class	62		29	33	0.119
1 drug, n(%)		53 (85.4)	23(79.3)	30(90.9)	
CCB		27(50.9)	17(73.9)	10(33.3)	
ACEI		26(49.1)	6(26.1)	20(66.7)	
2 drugs, n(%)		9(14.6)	6(20.7)	3(9.1)	
CCB + ACEI		8(88.9)	6 (100.0)	2(66.7)	
CCB + Thiazide like		1(11.1)	0(0.0)	1(33.3)	
BP control, n(%)	62		29	33	0,001
No		48(77.4)	19(65.5)	29 (87.9)	
Yes		14(22.6)	10(34.8)	4(12.1)	

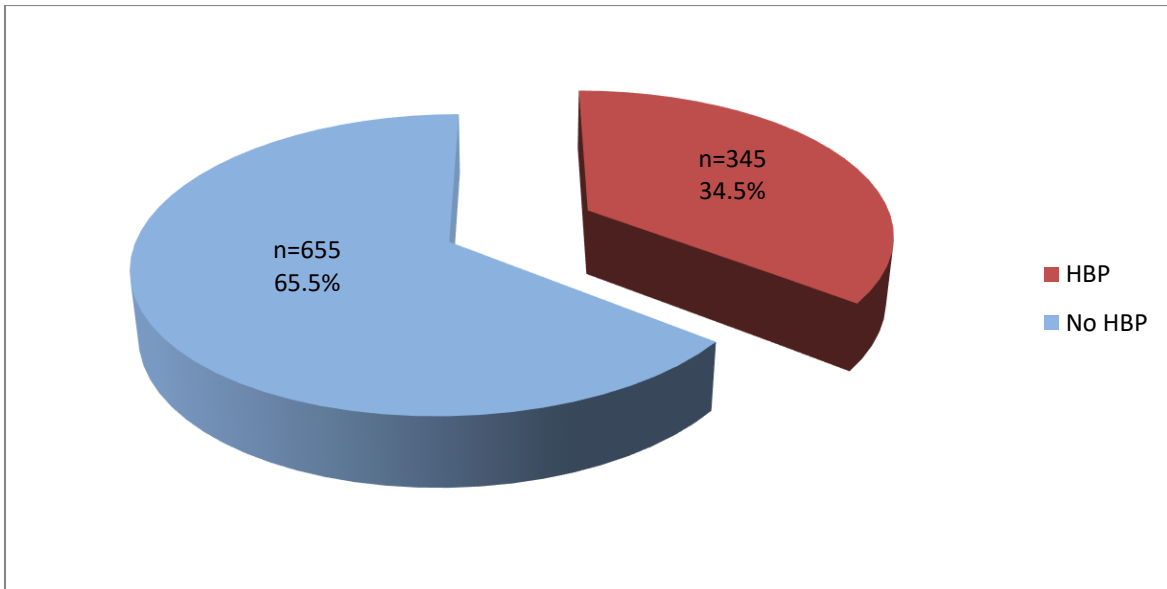
Data are expressed as absolute (n) and relative (in percent) frequencies. Abbreviations: CCB, calcium channel blocker ACEI, angiotensin converting enzyme inhibitor ARA, angiotensin type 1 receptor antagonist BP, blood pressure

**Tableau 4 Cardiovascular risk factors associated with hypertension in multivariate analysis.**

Variables	Univariate		Multivariate	
	p	OR (IC95%)	p	OR (IC95%)
Older age, yrs				
No		1		1
Yes	<b>&lt;0,001</b>	4,72(3,56-6,25)	<b>&lt;0,001</b>	2,98(2,05-4,35)
Smoking				
No		1		1
Oui	<b>0,002</b>	1,61(1,18-2,20)	0,153	1,34(0,90-1,99)
Physical inactivity				
No		1		1
Yes	<b>&lt;0,001</b>	1,87(1,39-2,50)	0,121	1,36(0,92-1,99)
Goutte				
No		1		1
Yes	<b>0,012</b>	3,34(1,30-8,55)	0,604	1,35(0,44-4,15)
Menopause				
No		1		1
Yes	<b>&lt;0,001</b>	3,54(2,64-4,77)	0,145	1,36(0,90-2,05)
ATS				
No		1		1
Yes	<b>&lt;0,001</b>	13,30(8,77-20,14)	<b>&lt;0,001</b>	8,90(5,65-14,02)
Overweight				
No		1		1
Yes	<b>0,001</b>	1,69(1,23-2,34)	0,096	1,90(0,17-3,06)
Obesity				
No		1		1
Yes	<b>0,001</b>	1,99(1,33-2,96)	<b>0,009</b>	2,68(1,92-3,17)
Central obesity				

No		1		1
Yes	<b>&lt;0,001</b>	2,26(1,73-2,95)	0,203	1,33(0,86-2,07)
DS				
No		1		1
Yes	<b>&lt;0,001</b>	2,53(1,73-3,69)	<b>&lt;0,001</b>	2,34(1,47-3,71)

Abbreviations : hypertension aOR, adjusted odds ratio CI,



**Fig.1. Distribution of the study participants according to hypertension status. Abbreviations: HBP, high blood pressure**