

# Prevalence of risk factors for chronic non-communicable diseases to the national teaching hospital “HKM” of cotonou

## Abstract

**Background:** In 2008 Non-Communicable Diseases (NCDs) are responsible for 63% of deaths world wide and 80% of these deaths occur in developing countries. Four of them are responsible for more than 80% of mortality from NCDs; which are: cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes. They share the same risk factors.

**Objective:** To determine the prevalence of NCD risk factors in patients admitted to consult in the outpatient unit of the National Teaching Hospital of Cotonou.

**Patients and Methods:** This was a transversal, descriptive and analytical study which took place from 15 June 2011 to 16 September 2011. It focused on 1,000 subjects found after a recruitment of all patients coming to consult during the study period. The collection technique was a questionnaire followed by physical measures (weight, height, blood pressure, waist ...) and biological measures (fasting glucose, cholesterol). The data were analyzed with the software Epi- 3.3.2 info.

**Results:** The prevalence of the main behavioural risk factors were: Smoking (10.2%); Alcohol consumption (60.3%); Insufficient intake of Fruits and Vegetables (84.2%); Physical inactivity (57.6%). The prevalence of physical risk factors were: Hypertension (47.4%); Obesity (27.5%); Overweight (35.3%). The prevalence of biological risk factors were: Diabetes (28.5%); Hypercholesterolemia (10.4%). The level of cardiovascular risk was higher than 40% in 81 people (8.1%).

**Conclusion:** This study shows the importance of risk factors for NCDs in outpatient Unit in the National teaching Hospital of Cotonou.

**Keywords:** prevalence, chronic non-communicable diseases, risk factors, benin

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**Abréviations:** NCD, non-communicable diseases; BMI, body mass index; GDP, gross domestic product ; WHO, world health organization ; CI, confidence interval ; AFR-D, africa region D

## Introduction

For a long time, the whole world and especially developing countries have invested in the fight against infectious diseases (tuberculosis, malaria, HIV/AIDS), maternal and perinatal conditions and malnutrition. Today, we are witnessing the epidemiological transition phenomenon which schematically is a decline of these diseases to chronic Non-Communicable Diseases (NCDs).<sup>1</sup>

Non-Communicable Diseases are the leading causes of death worldwide, killing more people each year than all other causes combined. Contrary to popular opinion, the available data show that nearly 80% of deaths from NCDs occur in low and middle income countries of the 57million deaths that occurred worldwide in 2008, 36million were due to Non-Communicable Diseases, mainly including cardiovascular diseases, cancers, diabetes and chronic lung diseases. The combined burden of these diseases is rising faster among low-income countries, populations and communities.<sup>2</sup>

This introductory study on NCD risk factors aims to determine the prevalence and to assess cardiovascular risk in hospital in Cotonou.

## Background and study method

The study was conducted in the outpatient unit of the National Teaching Hospital of Cotonou that is the reference hospital of Benin. Benin is a West African country, and in 2013 its population was 10.2million, GDP was 8.307billion US dollars and the poverty rate was 36%. There is no social security. The outpatient unit of the National Teaching Hospital has four consulting areas: internal medicine and medical oncology, endocrinology and metabolic diseases, neurology, rheumatology.

This was a transversal, descriptive and analytical study which took place from 15 June to 16 September 2011 and involved 1,000 patients. Were included, patients aged 15 and over who came to consult during the study period. Were excluded, patients who have not given their approval to participate in the study, pregnant patients, patients unable to answer questions. The minimum sample size (938) was calculated by using the formula of Schwartz. During the study period, we recruited all patients coming to consult with the above mentioned specialists and meeting the inclusion criteria.

The studied variables were socio-demographic (age, sex, level of education, occupation and marital status), behavioural (physical activity, consumption of fruits and vegetables, smoking, consumption alcohol), physical (blood pressure, weight, BMI), biological (blood

sugar, cholesterol). We defined regular physical activity by this way: doing at least 30minutes of physical activity of moderate intensity (e.g. hurried walking) for at least 5days out of 7. Insufficient consumption of fruits and vegetables: lower fruit and vegetable consumption in 5portions (400g) per day.

Active smoking was defined as the use of at least one cigarette or cigar or pipe for more than 6months. Passive smoking was defined by the voluntary or involuntary inhalation of smoke from one or more smokers. Alcoholism has been defined by the consumption of a standard drink equivalent to 10grams of pure ethanol. The heavy drinking was defined as consumption of 2 standard drinks or more per day for women or consumption of 4 standard drinks or more per day for men.

Harmful alcohol consumption was defined as the consumption of 4 standard drinks or more per day for women or consumption of 6 glasses or more per day in humans. High blood pressure (hypertension) was defined by systolic blood pressure (SBP)  $\geq 140$  and a diastolic blood pressure (DBP)  $\geq 90$ mmHg. Obesity was defined as BMI  $\geq 30$ kg/m<sup>2</sup>, overweight by BMI  $\leq 25 < 30$ kg/m<sup>2</sup>, Abdominal obesity was defined as a waist circumference  $> 88$ cm in women and  $> 102$  in humans. We considered diabetic any subject having a fasting glucose  $\geq 1.26$ g/l rechecked at least once, or any subject under anti-diabetic drugs. Hypercholesterolemia was defined by a cholesterol  $\geq 2.5$ g/l.

The collection technique was done by a questionnaire. We filled out for each patient the questionnaire on risk factors. At the end of the consultation, we suggested to the patient achieving a fasting blood glucose and cholesterol, and we followed the appointment of control

patients to retrieve the results. Laboratory tests were dependent to patients. We also evaluated the cardiovascular risk at 10years of each subject by using the WHO diagram of prediction of cardiovascular risk for AFR-D region.

The collected data were entered by using Epi-data 3.1 and analyzed with Epi-Info 3.3.2 software. Qualitative variables were described by using percentages and their confidence intervals. Quantitative variables were described by using the average and standard deviation. Comparisons of frequency were made by using the Chi test 2 and the comparisons of average with the test Student. A p-value  $\leq 0.05$  was statistically considered significant.

## Results

Among the 1,000 patients included in our study, 444 were male (44.4%) and 556 women (55.6%). The sex ratio was 0.79. The average age of patients was 48, 1years $\pm$ 14,5years.

### Prevalence of behavioral risk factors

Smoking prevalence was 10.2%(n=102) (95% CI: 8.3%-12.1%). Among the 444 male subjects, 53 were smokers, a prevalence of 11.9% against 8.8% among 556 female subjects. The difference between these two prevalences was not statistically significant (p=0.11). Smoking prevalence was higher among those aged from 26 to 35 but the difference was not statistically significant (p=0.12). Smoking prevalence was significantly higher among patients not attending school (p=0.03). There was no statistically significant difference in terms of occupation and marital status (Table 1).

**Table 1** Distribution of patients based on behavioural risk factors alcoholism

Alcoholism										
	Smoking	p	Harmful	p	Abusive	p	F and V*	p	PI*	P
<b>Global</b> (n=1000)	10.20%		1.30%		9.70%		84.20%		57.60%	
<b>Sex</b>		0.11		0.02		0.05		0.21		<0.01
Male (n=444)	11.90%		2.30%		7.70%		85.80%		51.80%	
Female (n=556)	8.80%		0.50%		11.30%		82.90%		62.20%	
<b>Age (years)</b>		0.12		1		0.41		0.02		0.01
15-25 (n=83)	2.40%		1.20%		0,06		91.60%		48.20%	
26-35 (n=139)	12.90%		1.40%		7.90%		81.30%		52.50%	
36-45 (n=183)	9.80%		1.10%		9.80%		90.70%		63.90%	
46-55 (n=252)	11.90%		1.60%		12.30%		82.50%		0,52	
56-65 (n=211)	0,1		1.40%		10.90%		80.10%		62.60%	
>65 (n=132)	9.80%		0.80%		6.80%		83.30%		62.90%	
<b>Level of education</b>		0.03		0.6		0.05		<0.01		<0.001
Not schooling (n=83)	19.30%		1.20%		7.20%		92.80%		63.90%	
Primary (n=200)	10.50%		0,02		0,13		87.50%		70.50%	
Secondary (n=442)	9.50%		0.90%		10.90%		85.10%		56.30%	
Higher (n=275)	8.40%		1.50%		6.20%		77.80%		48.40%	

Table Continued...

Alcoholism										
	Smoking	p	Harmful	p	Abusive	p	F and V*	p	PI*	P
<b>Occupation</b>		0.22		0.9		0.54		0.04		<0.001
Civil servant (n=286)	10.80%		1.40%		9.80%		81.80%		45.50%	
Private (n=81)	11.10%		1.20%		7.40%		77.80%		61.70%	
Independent (n=301)	0,12		0,02		0,12		88.40%		67.40%	
Learner* (n=79)	2.50%		0		5.10%		91.10%		45.60%	
Housewife (n=67)	11.90%		0		11.90%		79.10%		68.70%	
Unemployed (n=4)	0		0		0		1		1	
Retirees (n=182)	8.80%		1.10%		8.20%		82.40%		58.80%	
<b>Marital status</b>		0.09		0.67		0.86		0.71		0.18
Single (n=149)	5.40%		0.70%		7.40%		86.60%		51.70%	
Married (n=653)	10.30%		1.40%		10.10%		83.50%		58.80%	
Divorced (n=12)	16.70%		0		8.30%		0,75		41.70%	
Widower (n=58)	15.50%		0		8.60%		84.50%		67.20%	
Concubine (n=128)	12.50%		2.30%		10.90%		85.90%		55.50%	

Learner=student / apprentice; PI=Physical inactivity; F and V=low fruit and vegetable

The prevalence of alcohol consumption was 60.3% (n=603) with a male predominance (66.2% in men and 55.6% women). The prevalence of harmful alcohol consumption was significantly higher in men than that of women (p=0.02). There was no statistically significant difference according to age, education, occupation or marital status (Table 1).

The prevalence of alcohol abuse was significantly higher in men than in women (p=0.05). This prevalence was significantly higher among the less educated patients. There was no significant difference in terms of age, occupation or marital status (Table 1).

The prevalence of low fruit and vegetables was 84.2% (n=842). Among the 444 males, 381 were not consuming enough fruits and vegetables, a prevalence of 85.8% versus 82.9% of the 556 female subjects (p=0.21). The prevalence of low fruit and vegetables varied significantly with age (p=0.02) and occupation (p=0.04). The prevalence of consumption of fruit and vegetables failure was higher among the non-schooling and those who had a primary and secondary school level (p<0,01). There was no statistically significant difference with marital status (Table 1).

The prevalence of physical inactivity was 57.6%(n=576). It was 51.8% in men versus 62.2% in women (p<0.01). It varied statistically with age groups (p=0.01), educational level (p<0.001) and occupation (p<0.001). There was no statistically significant difference between marital status (Table 1).

### Prevalence of physical and biological risk factors

Hypertension prevalence was 47.4%(n=474). Among the 444 males, 203 were hypertensive, a prevalence of 45.7% and 556 female subjects, 271 had hypertension, a prevalence of 48.7%(p=0.37). The prevalence of hypertension increased significantly with age (p<0.001) and educational level (p=0.01). It was significantly lower among

single (p<0.001). The prevalence was significantly higher among the housewife and retired (p <0.001).

Overweight prevalence was 35.3%(n=353). It was 36.5% in men versus 34.4% in women with no statistically significant difference. It was higher among patients of 36 to 55years with a statistically significant difference (p<0.001). The prevalence of overweight was significantly higher among state employees (civil servants) and housewives (p<0.001), married and unmarried partners (p<0.001). There was no significant difference in the level of education (Table 2).

Obesity prevalence was 27.5%(n=275). It was significantly higher among women 36% than males 16.9% (p <0.001) and in the age group 46 to 55years (p<0.001). It was significantly higher among the unemployed, housewives (p<0.001) as well as divorced (p<0.001). There was no statistically significant difference between the levels of education (Table 2).

Abdominal obesity prevalence was 34.8%. It was significantly higher with women (51.1%) than in men (14.4%). It was significantly higher in the age group of 46 to 65, in school, and patients with primary level education, among housewives and unemployed, and among the widowed and divorced (Table 2).

The prevalence of diabetes was 28.5%(n=348). There was no significant difference between the two sexes. It was significantly higher in the age group 56 to 65years (p<0.001) among retirees (p<0.001) and divorced (p<0.001) (Table 2).

Among the 1000 subjects investigated, only 405 have performed the test of cholesterol. Hypercholesterolemia was observed in 42 people, a prevalence of 10.4%. The prevalence of hypercholesterolemia was significantly higher in women (p<0.001). It significantly increased with age (p <0.01). It was significantly higher with divorced. It had no significant difference in the level of education (Table 3).

**Table 2** Distribution of patients based on physical and biological risk factors

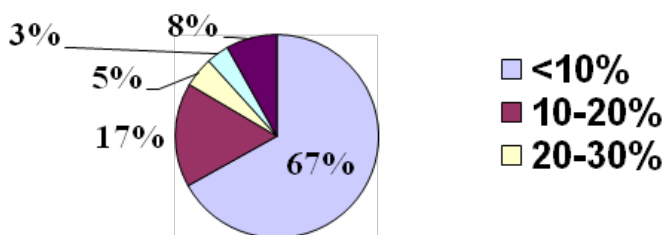
	HT*	p	Over weight	p	Obesity	p	Abdominal obesity	p	Diabetes	p
Global (n=1000)	47.40%		35.30%		27.50%		34.80%		28.50%	
<b>Sex</b>		0.37		0.52		<0.001		<0.001		0.67
Male(n=444)	45.70%		36.50%		16.90%		14.40%		27.70%	
Female(n=556)	48.70%		34.40%		36.00%		51.10%		29.10%	
<b>Age (years)</b>		<0.001		<0.001		<0.001		<0.001		<0.001
15 – 25 (n=83)	4.80%		12.10%		4.80%		6.00%		10.80%	
26 – 35 (n=129)	20.10%		27.30%		20.10%		26.60%		19.40%	
36 – 45 (n=183)	39.30%		41.50%		31.70%		37.20%		20.20%	
46 – 55 (n=252)	60.30%		41.30%		35.30%		44.40%		33.30%	
56 – 65 (n=211)	62.60%		38.40%		28.90%		40.30%		41.20%	
>65 (n=132)	65.20%		33.30%		26.50%		31.00%		31.10%	
<b>Level of education</b>		<0.01		1		0.16		0.02		0.15
Non schooling (n=83)	38.90%		34.90%		26.50%		43.40%		32.50%	
Primary(n=200)	47.20%		35.50%		33.00%		40.50%		24.50%	
Secondary(n=442)	52.50%		35.50%		27.60%		34.20%		31.50%	
Higher(n=275)	59.00%		34.90%		23.60%		29.10%		25.50%	
<b>Occupation</b>		<0.001		<0.001		<0.001		<0.001		<0.001
Civil servant(n=286)	45.50%		42.70%		23.80%		32.20%		26.90%	
Private Worker(n=81)	32.10%		30.90%		29.60%		36.70%		26.60%	
Independent (n=301)	49.50%		33.20%		33.20%		40.50%		26.90%	
Learner(n=79)	7.60%		15.20%		3.80%		3.80%		12.70%	
Housewife (n=67)	58.20%		44.80%		40.30%		58.20%		31.30%	
Unemployed(n=4)	25.00%		25.00%		50.00%		50.00%		0.00%	
Retirees(n=182)	67.00%		34.60%		28.00%		33.50%		41.20%	
<b>Marital status</b>		<0.001		<0.001		<0.001		<0.001		<0.001
Single(n=149)	18.10%		18.80%		10.70%		11.40%		16.10%	
Married(n=653)	53.40%		39.50%		30.80%		38.30%		30.30%	
Divorced(n=12)	50.00%		25%		50.00%		50.00%		66.70%	
Widower(n=58)	58.60%		29.30%		36.20%		53.40%		43.10%	
Concubine(n=128)	45.30%		36.50%		24.20%		34.40%		23.40%	

HT=Hypertension

**Table 3** Distribution of patients according to biological risk factors

	Hypercholesterolemia	p
<b>Global(n=405)</b>	10.40%	
<b>Sex</b>		<0.001
Male(n=178)	0.60%	
Female(n=227)	11,00%	
<b>Age(years)</b>		<0.01
26 – 35(n=9)	2.30%	
36 – 45(n=17)	4.20%	
46 – 55(n=53)	13,00%	
56 – 65(n=57)	14,00%	
>65(n=69)	17,00%	
<b>Level of education</b>		0.91
Non schooling(n=29)	6.90%	
Primary(n=70)	10,00%	
Secondary(n=198)	10.10%	
Higher(n=108)	12,00%	
<b>Occupation</b>		0.34
Civil servant(n=118)	11,00%	
Private worker(n=35)	5.70%	
Independent (n=115)	10.40%	
Student (n=27)	0,00%	
Housewife (n=26)	11.50%	
Retiree (n=84)	14.30%	
<b>Marital status</b>		<0.01
Single (n=11)	2.60%	
Married (n=43)	10.50%	
Divorced (n=116)	28.60%	
Widower (n=54)	13.30%	
Concubine (n=47)	11.50%	

The cardiovascular risk was less than 10% in 66% of patients, but 8% of them had a risk greater than 40% (Figure 1). Cardiovascular risk was significantly higher among patients with abdominal obesity, hypertension and diabetes (Table 4).



**Figure 1** Distribution of the patients according to their level of cardiovascular risk.

**Table 4** Relationship between cardiovascular risk and some risk factors

	<10%	10-20%	20-30%	30-40%	>40%	p
<b>Yes (n=102)</b>	68.60%	13.70%	3.90%	3.90%	9.80%	0.9
<b>No (n=898)</b>	66.70%	16.90%	4.90%	3.60%	7.90%	
<b>Alcoholism</b>						
<b>Yes (n=603)</b>	65.80%	16.90%	4.30%	3.60%	9.30%	0.78
<b>No (n=397)</b>	68.50%	16.10%	5.50%	3.50%	6.30%	
<b>Physical activity</b>						
<b>No (n=576)</b>	64.80%	17,00%	4.30%	4.50%	9.40%	
<b>Irregular (n=313)</b>	71.10%	15.90%	5.10%	2.50%	5.40%	0.28
<b>Regular (n=111)</b>	66.10%	16.50%	6.40%	1.80%	9.20%	
<b>Abdominal obesity</b>						
<b>Yes (n=348)</b>	50.60%	24.70%	6.30%	5.70%	12.60%	<0.001
<b>No (n=652)</b>	75.60%	12.30%	4,00%	2.50%	5.70%	
<b>HT</b>						
<b>Yes (n=474)</b>	37.60%	29.50%	8.20%	7.60%	17.10%	<0.001
<b>No (n=526)</b>	93.30%	4.90%	1.70%	0	0	
<b>Diabetes</b>						
<b>Yes (n=285)</b>	47.70%	22.50%	10.50%	7,00%	12.30%	<0.001
<b>No (n=715)</b>	74.50%	14.30%	2.50%	2.20%	6.40%	

## Discussion

This study allowed us to evaluate the prevalence of risk factor of Non Communicable Diseases in hospitals. Smoking prevalence in our sample was 10.2%. It is lower than that of Kouassi in Abidjan population 36.5% in 2009<sup>3</sup> and Hounkpatin in Lome 25% in 2007.<sup>4</sup> Our prevalence is similar to that of Tesfaye F et al.<sup>5</sup> 11%, according to an investigation conducted in Addis Ababa in Ethiopia in 2006<sup>5</sup> For Awoke et al.<sup>2</sup> 2014 smoking prevalence varied from 7.3% to 8.5% in Addis Ababa.<sup>2</sup>

The prevalence of alcohol consumption was 60.3%. This prevalence was similar to that found in South Africa 65.5%.<sup>6</sup> It was less than that of Cameroon<sup>7</sup> which 85% was in urban areas. Our prevalence was high compared to the 54% prevalence of alcoholism in the central and southern Nigeria in 2005.<sup>8</sup>

The prevalence of nutritional imbalance by fruit and vegetable consumption failure was 84.2%. It was close to that of AR et al Gbary in Benin in 2011 in the general population which was about 80%.<sup>9</sup>



According to WHO, 60% of the world population fail to maintain activity at recommended levels to induce health benefits.<sup>10</sup> This prevalence was close to 57.6% found in our study. The lifestyle Westernization of the African urban population can explain this prevalence. A lower prevalence 43.30% was found by Seck et al. according to a study in Senegal.<sup>11</sup> The prevalence of hypertension was 47.4% or 45.70% of men and 48.70% women. This prevalence was higher than that found in the general population, 27.9% in Benin in 2008<sup>9</sup> 36.7% in Lome in 2011.<sup>12</sup> 34.5% to Brazzaville in 2006.<sup>13</sup>

This high prevalence can be explained in part by the study population which was in hospital among which 77.8% had more than 35years. And secondly the prevalence of hypertension increases with age.<sup>14</sup> Outside Africa, MONA LISA study in France had found 47% of men and 35% women;<sup>15</sup> a larger study across Europe in 2006 had found a higher prevalence of 44% in 2006.<sup>16</sup> Obesity is now present in all countries in the world. Its prevalence particularly high in some industrialized countries is also increasing in developing countries. The prevalence of 27.5% was much higher than that of West African populations estimated to 10%.<sup>17</sup> However, a higher prevalence 32.9% was found in outpatient unit in Lome by Pessinaba et al.<sup>18</sup> Also, a similar prevalence was 27.7% found in Tunisia in 1996.<sup>19</sup> Outside of Africa, the prevalence is also similar to that observed in Kosovo 32.7% in subjects aged 30 to 83years.<sup>20</sup>

As overweight, its prevalence was 35.3%. It is similar to that found in 2008 in Tlemcen (Algeria), which was 32%.<sup>21</sup> It did not vary significantly by gender. Several studies in the continent have reported a prevalence of overweight in women.<sup>22, 23</sup> On the contrary; Vernay and al. noted a prevalence of overweight in men<sup>24</sup> in French. Our study reported a prevalence of 34.8% of abdominal obesity with a female predominance 51.1% versus 14.4%. The same trends were found by other authors Ghannem H & Hadj Fredj A.<sup>19</sup> Other studies in Africa showed 10.2% in Tunisia,<sup>19</sup> 10.4% in Senegal.<sup>25</sup>

The prevalence of hypercholesterolemia was 10.4%. Through Africa and the world the prevalence values of hypercholesterolemia differ significantly. In 2007, 33.4% were obtained in Senegal; 6.3% in Algeria.<sup>26</sup>

## Conclusion

It evidently comes out of our study an inactiveness of the population of Cotonou especially among women, a low consumption of fruits and vegetables especially among the less educated population. This passiveness was probably the cause of overweight and obesity observed especially among employees in the public service and married people. The prevalence of hypertension increased progressively with age while the prevalence of diabetes was higher among the population aged from 56 to 65 and among the divorced. The prevalence of hypercholesterolemia and increased with age among divorced. There was a high prevalence of behavioral risk factors, physical and biological. However, cardiovascular risk remained low in most of the population. However it was more important among patients with abdominal obesity, hypertension and diabetes.

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Djossou Alfred : Translator

Agossou Alain : Computer Scientist

Houngbegnon Parfait : Statistician

## Conflict of interest

Author declares that there is no conflict of interest.

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