



## Original Article

## Prevalence of Cardiovascular Risk Factors among the Employees of the Yaoundé University Teaching Hospital

*Prévalence des facteurs de risque cardiovasculaire chez le personnel du Centre Hospitalier et Universitaire de Yaoundé*

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## ABSTRACT

**Background :** Cardiovascular diseases have reached epidemic proportions, with the greatest impact in low-income settings. Our study aimed to describe the sociodemographic characteristics, determine the prevalence of cardiovascular risk factors, and estimate the cardiovascular risk in a group of Cameroonians health workers. **Methods :** Between January 2 and May 31, 2017, we carried-out a cross-sectional descriptive study in the Yaounde University Teaching Hospital (UTH). The participants were health personnel. We collected the following data : sociodemographic characteristics (age, sex, profession), anthropometry (weight, height, waist circumference), resting blood pressure, and fasting blood glucose. We calculated the global cardiovascular risk using the National Health and Nutrition Examination Survey (NHANES) score. **Results:** We recruited 253 participants (46 males). Their mean age was 42.3±9.5 years. Sedentarity was the most frequent risk factor (88.5%). This was followed by low-intake of fruits and vegetables (75.5%), abdominal obesity (47.8%), excessive alcohol intake (32.8%), arterial hypertension (23.3%), diabetes (5.9%), and tobacco use (0.8%). The rate of awareness was 40% for hypertension and diabetes. The global cardiovascular risk was low in 87%, moderate in 9.5%, and high in 3.4%. This risk was higher in males. **Conclusion:** Cardiovascular risk factors are frequent among the employees of the Yaoundé University Teaching Hospital. The rate of global risk is higher in males. The rate of awareness is less than fifty percent.

## RÉSUMÉ

**Introduction.** Les maladies cardiovasculaires ont atteint des proportions épidémiques, avec le plus grand impact dans les milieux à faible revenu. Notre étude avait pour objectif de décrire les caractéristiques sociodémographiques, de déterminer la prévalence des facteurs de risque cardiovasculaire et d'estimer le risque cardiovasculaire chez un groupe de professionnels de la santé camerounais. **Méthodologie.** Nous avons mené une étude transversale descriptive au Centre Hospitalier et Universitaire de Yaoundé (CHUY) du 2 janvier au 31 mai 2017. L'étude a porté sur les employés du CHUY. Les données recueillies étaient : les caractéristiques sociodémographiques (âge, le sexe, la profession), les paramètres anthropométriques (poids, taille, tour de taille), pression artérielle au repos, et la glycémie à jeun. Le risque cardiovasculaire global a été calculé à l'aide du score de la "National Health and nutrition examination Survey" (NHANES). **Résultats :** Nous avons recruté 253 participants (46 hommes). L'âge moyen était de 42,3±9,5 ans. La sédentarité était le facteur de risque le plus fréquent (88,5%). Elle était suivie par la consommation inadéquate en fruits et légumes (75,5%), l'obésité abdominale (47,8%), la consommation d'alcool à risque (32,8%). Enfin venaient l'hypertension artérielle (23,3%), le diabète (5,9%) et la consommation de tabac (0,8%). Le taux de sensibilisation était de 40% pour l'hypertension et le diabète. Le niveau de risque cardiovasculaire global était faible chez 87,0%, modéré chez 9,5% et élevé chez 3,4%. Le niveau de risque était plus élevé chez les hommes. **Conclusion :** Les facteurs de risque cardiovasculaires sont présents au sein du personnel du CHUY. Le niveau de risque cardiovasculaire à cinq ans est plus élevé chez les hommes. Le taux de sensibilisation est inférieur à 50%.

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## INTRODUCTION

Cardiovascular diseases (CVDs) are the leading cause of death worldwide. An estimated 17.5 million people died in 2012–30% of all deaths worldwide. Of these, 7.5 millions were due to Ischemic Heart Disease (IHD), and 6.7 million were due to stroke [1]. The greatest burden is found in low-income settings due to epidemiologic transition, where communicable diseases still pose challenges. The causes of CVDs are a public health priority due to the constant increase in the risk factors. In 1998, the prevalence of hypertension in Cameroon was 18.5% in males, and 12.6% in females, and this increased to 37.2% in males and 37.5% in females in 2012 [2]. A nation-wide survey of hypertension showed a prevalence of 29.7% in Cameroon. [3]. Besides hypertension, other associated CVDs risk on the rise are : diabetes, tobacco use, obesity, and sedentarity [4,5]. In most countries, emphasis is placed on curative rather than preventive treatment [6]. This strategy is not cost-effective.

## PATIENTS AND METHODS

### Study design and setting

Between January and May 2017, we carried out a cross-sectional study using the WHO Stepwise approach at the Yaounde University Teaching Hospital (UTH). Yaounde is the political capital of Cameroon–central Africa sub-region, with a population of about 2.5 million inhabitants. The UTH is one of the main teaching hospitals, with about 488 personnel, and 170 beds. Besides curative medicine and teaching, this Hospital is also involved in preventive medicine.

### Participants

These were personnel who worked at the UTH. We prospectively recruited consenting adult participants, aged  $\geq 20$  years, of both sexes, from all the corps of the Hospital–Medical Doctors, Nurses, Nurse Assistants, Laboratory Technicians, Administration, and the support staff. We excluded those who were pregnant during the study period.

### Variables

For each participant, we collected socio-demographic data (age and sex), and life-styles (alcohol use, tobacco use, fruit and vegetable consumption, and physical exercise). We measured their weight, height, abdominal circumference, and their resting sitting blood pressures on both arms. We measured their fasting capillary blood glucose after strict asepsis on the tip of the major–we performed a second measure another day if this was  $> 1.26$  g/L.

### Procedure

We proceeded in two phases (WHO STEPs one and two). In phase 1, we interviewed participants to obtain socio-demographic and life-style data (WHO STEPs one). After at least 10 minutes of rest and no prior use of any stimulant, we measured their blood pressure on both arms in the sitting position using an automatic

blood pressure machine (OMRON® M2 Basic et M3). The average of three measurements was recorded. We then measured their weight (kg) in light clothing using an electronic scale balance (OMRON® HN289), with a precision of 100g. We measured their height (cm) with a stadiometer. We calculated their Body Mass Index (BMI) as the Weight (kg)/Height (m<sup>2</sup>) squared. We measured the abdominal circumference (cm) in the mid-axillary line, midway between the iliac crest and the lowest rib (WHO STEPs two). In phase 2 (WHO STEPs three), we measured their fasting capillary blood glucose with a glucometer (ACCU-CHEK®). We assessed their global cardiovascular risk using the: National Health and Nutrition Examination Survey (NHANES) score. We dichotomised all our variables as present or absent of a risk factor.

### Working definitions

We defined hypertension as a systolic blood pressure  $\geq 140$  mmHg and or a diastolic blood pressure of  $\geq 90$  mmHg, or a patient on anti-hypertensive medicine. We defined diabetes as a persistent capillary blood glucose  $\geq 1.26$  g/L or a participant on anti-diabetic agent. We defined global obesity as a BMI  $\geq 30$  kg/m<sup>2</sup>. We defined abdominal obesity as a girth  $> 94$  cm in men, and  $> 80$  cm in women. We defined sedentarity as lack of physical exercise for at least 30 minutes daily, and at least three times per week. We defined excessive alcohol intake as  $> 20$ g/day in men, and  $> 10$ g/day in women. We defined low fruit and vegetable intake as less than 5 portions per day. We defined tobacco consumption as use of tobacco in any form–Cigarette, Cigar, Snuff, and Chewing.

### Sample size and Statistical analysis

A convenience sample of all eligible participants was considered for this study. We analyzed the data using the software IBM SPSS version 20. We used the Chi squared test or the Student exact test when appropriate to compare the proportions. We have presented the data as frequencies and percentages. We have presented the risk factors according to sex and the core (Physicians, Nurses, Laboratory Technicians, Administration, and other support staff). A p value  $< 0.05$  was considered statistically significant for the observed differences.

### Ethical considerations

This study was approved by the Institutional Review Board of the Faculty of Medicine and Biomedical Sciences of the University of Yaounde 1. The administration of the UTH gave administrative clearance. We carried out this work in accordance with the declarations of Helsinki. We report this work in accordance with the Standards for Reporting Epidemiologic Studies (STROBE) guidelines.

## RESULTS

We recruited a total of 253 participants. Their mean age was  $42.3 \pm 9.5$  years, and ranged from 20 to 66 years. There were 46 (18.2%) males and 207 (81.8%) females. Table I shows the socio-demographic characteristics of the study population. The most

frequent age group was between 36 and 45 years. There were 16 (34.8%) males aged  $\geq 50$  years, and 3 (1.5%) females aged  $\geq 60$  years. The nursing staffs were the most frequent.

**Table I: Socio-demographic characteristics of the study population**

Variable	Frequency	Percentage
<b>Sex</b>		
Male	46	18.2
Female	207	81.8
<b>Age range (years)</b>		
$\leq 35$	63	24.9
36 – 45	96	37.9
46 – 55	66	26.1
56 – 66	28	11.1
<b>Profession</b>		
Physician	15	5.9
Nurse	88	34.8
Nurse assistant	35	13.8
Technician	26	10.3
Administration	25	9.88
<b>Others</b>	64	24.9

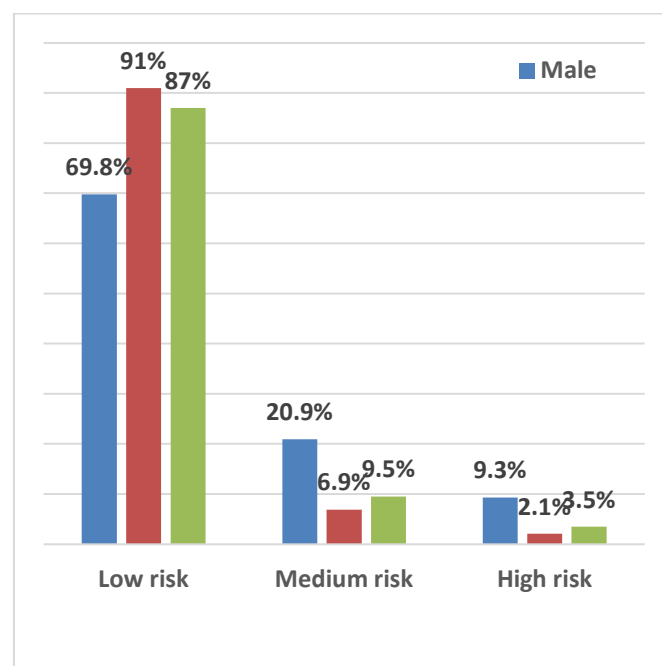
Table II shows the prevalence of the classic cardiovascular risk factors according to sex. Sedentarity and low-intake of fruit and vegetables were the most frequent risk factors. Global and abdominal obesity were significantly more frequent in females, while alcohol consumption was significantly more frequent in males. Arterial hypertension was seen in 59 (23.3 %) participants—24 old cases, and 35 newly diagnosed cases. The awareness rate of hypertension was 40.7%. Diabetes was seen in 16 (5.9%) participants—6 old cases, and 9 new cases. The awareness rate of diabetes was 40%.

**Tab II: Prevalence of cardiovascular risk factors according to sex.**

	Total N (%)	Male N (%)	Female N (%)	<i>p</i> value
Age $\geq 50$ (male) Or $\geq 60$ (female)	19 (7.5%)	16 (34%)	3 (1.5%)	<0.001
Abdominal obesity	121 (47.8)	7 (15.2)	114 (55)	0.001
Global obesity	89 (35.2)	10 (21.7)	79 (38.1)	0.035
Alcohol	83 (32.8)	28 (60.8)	55 (26.5)	0.001
Hypertension	59 (23.3)	11 (23.9)	48 (23.1)	0.91
Diabetes	15 (5.9)	4 (8.6)	11 (5.3)	0.38
Tobacco use	2 (0.7)	2 (4.3)	0 (0)	NA
Sedentarity	223 (88.1)	41 (89.1)	182(88)	0.81
Low fruit/ Vegetable intake	191 (75.5)	39 (84.8)	152(73.4)	0.10

Table III shows the prevalence of cardiovascular risk factors according to profession. Tobacco consumption was noted in two laboratory technicians. Compared to the medical and para-medical staff, the administrative staff had higher rates in 5 of the 8 cardiovascular risk factors. The medical staff had rates in 2 of the cardiovascular risk factors (hypertension and sedentarity) compared to the para-medical and administrative staff. We assessed the global cardiovascular risk in 231 participants (43 males and 188 females).

Figure 1 shows the global cardiovascular risk according to sex. A low risk was seen in 201 (87%), medium risk in 22 (9.5%), and high risk in 8 (3.5%) participants. Males had higher rates of medium and high CVD risk. All (100%) of those  $\leq 40$  years ( $n=104$ ) had low risk. In those aged  $> 40$  years ( $n=127$ ), low risk was seen in 97 (76.4%), medium risk in 22 (17.3%), and high risk in 8 (6.3%).



**Figure 1: Distribution of the level of global cardiovascular risk in 231 of the participants (Males: 43, and Females: 188)**

**Table III: Distribution of cardiovascular risk factors according to profession.**

Variable, n (%)	Medical (n=15)	Para-medical (n=149)	Administrative (n=25)	Others (n=64)
<b>Hypertension</b>	3 (20)	28 (18.8)	4(16)	24 (37.5)
<b>Diabetes</b>	1 (6.6)	7 (4.7)	3 (12)	4 (6.3)
<b>Sedentarity</b>	14 (93.3)	129 (86.6)	20(80)	59(92.2)
<b>Tobacco consumption</b>	0	2 (1.3)	0 (0)	0 (0)
<b>Global Obesity</b>	4 (26.6)	47 (31.5)	10 (40)	28 (43.8)
<b>Abdominal Obesity</b>	4(26.6)	70 (47)	16 (64)	31 (48.4)
<b>Alcohol consumption</b>	4 (26.7)	38 (25.5)	10 (40)	31 (48.4)
<b>Low fruit/Vegetable intake</b>	10 (66.6)	109(73.1)	19(76)	53 (82.8)

## DISCUSSION

We carried out a cross-sectional descriptive study to assess the prevalence of cardiovascular risk factors in a group of health workers in the University Teaching Hospital (UTH) of Yaounde. The most prevalent risk factors were lifestyle related –sedentarity and low fruit and vegetable intake, and abdominal obesity.

The socio-demographic characteristics of the study population are similar to that reported by other authors [7][8]. The pattern of risk factors differs with other studies. Ameera et al [10] reported overweight and hypertension as the most frequent risk factors, while Toba et al [12] reported dyslipidemia, overweight and abdominal obesity as the most frequent risk factors. We did not test for serum lipids due to financial constraints.

We noted higher rates of sedentarity especially in the physicians compared to that reported by Almairac et al [9] and Ameera et al [10] who reported 66.3% and 50.8% respectively. This could be due to high work load as result of high patient-doctor ratio in low-income settings, with little time for leisure activities [9].

Low fruit and vegetable intake was significantly higher than that reported by Ameera et al [10] who reported 24%. There is a high seasonal variation in the availability of fruits and vegetables, which remain expensive in our setting. The non-habitual consumption could be a contributing factor.

The rate of alcohol intake was similarly reported by Ewane et al [2] in a similar setting in Cameroon, but higher than the 2.6% reported by Sanjeev et al [11]. Alcohol consumption is socially accepted in our setting. It is highly consumed in social gatherings.

Tobacco consumption was lower than the 13.2% rate of the general population. Ngahane et al [7] reported 5.4% of tobacco use in a similar Hospital setting, while Kazemi et al [12] reported 3.9%. Ameera et al [10], Sanjeev et al [11], and Kouassi et al [13] reported higher rates of tobacco use – 16%, 12.5%, and 36.5% respectively. This was main seen in male health workers. In our setting, there are programmes to fight against tobacco use. Cultural background could also influence its use.

The prevalence of abdominal obesity was comparable to that reported by other authors [10, 14]. This was significantly higher in females. Physiologic and cultural influence play major role in this pattern of obesity. It is a sign of good health and beauty in certain cultures in our setting.

The prevalence of hypertension was lower than that of the general population of Cameroon [3]. This was comparable to the 20.7% reported by Sanjeev et al [11], and higher than the 9% reported by Kazemi et al [12]. We noted a low rate of awareness of hypertension in this population. This stresses the need for regular screening in the Hospital setting.

The prevalence of diabetes was higher than the 3.9% reported by Kazemi et al [12]. These differences are multifactorial. The awareness rate of diabetes was also low amongst these health personnel. This further stresses the need for regular health screening.

The pattern of global cardiovascular risk was different to that reported in the Maghreb region. Fewer participants in our survey had moderate to high risk compared to that reported by Tachfouti et al [15], who reported moderate and high risk in 27.5% and 23% respectively. The pattern of risk was consistently higher in males, and with age. Males have been shown to be 2 to 5 times more at risk of CVDs than females [16]. Physiologic changes play an important role in pre-menopausal women. This female protection is lost after menopause.

### Limitations

We report on the prevalence of cardiovascular risk factors in a group of health care workers. We did not assess the serum cholesterol due to financial constraints. This did not permit us calculate the risk using dedicated calculators like the Framingham risk score. However, the National Health and Nutrition Examination Survey (NHANES) score is a useful tool to assess risk in epidemiological studies. We had inequality in the representation of the participants. The medical personnel (doctors), as well as the male sex were under-represented. This reduced the power of the study to detect significant differences. However, this is the first study to assess the prevalence of cardiovascular risk factors in this Hospital.

## CONCLUSION

We found high rates of cardiovascular risk factors in this group of health workers of the University Teaching Hospital. In decreasing order, we found: sedentarity, low fruit and vegetable intake, obesity, excessive alcohol consumption, hypertension, diabetes, and tobacco use. The rate of awareness was 40% for arterial hypertension and diabetes. The global cardiovascular risk was lower, especially in women. This stress the need for regular screening of CVDs risk factors in the hospital setting, and institute appropriate preventive measures such as promoting regular physical activity, and healthy eating habits.

**What is known on this subject:** Cardiovascular diseases are the main causes of morbidity and mortality worldwide, with the greatest impact in low-income settings.

**What this study adds:** There is a high prevalence of cardiovascular risk factors in health care workers in the University Teaching Hospital—mainly sedentarity and low—intake of fruits and vegetables.

## CONFLICT OF INTEREST

None to declare.

## REFERENCES

1. World Health Organisation. Cardiovascular diseases. January 2015. Available: [http://www.who.int/cardiovascular\\_disease.fr](http://www.who.int/cardiovascular_disease.fr)
2. Ewane M E, Mandengue S H, Priso E B, Tamba S M, Ahmadou, Fouda A B. Dépistage des maladies cardiovasculaires chez des étudiants de l'Université de Douala et influence des activités physiques et sportives. *Pan Afr Med J*. 24 April 2012;11(1)77
3. Kingue S, Ndong N C, Menanga PA, Jingi A M, Noubiap J J N, Fesuh B et al. Prevalence and Risk Factors of Hypertension in Urban Areas of Cameroon: A Nationwide Population-Based Cross-Sectional Study. *JCH*. Oct 2015;17(10)819-24.
4. Levenson J W, Skerrett P J, Gaziano J M. Reducing the Global Burden of Cardiovascular Disease: The Role of Risk Factors. *Prev Cardiol*. Oct 2002 ;5(4):188–99.
5. Ahinaga A J. Prévalence des artériopathies oblitérantes des membres inférieurs asymptomatiques [Thesis]. Yaoundé : Faculté de Médecine et des sciences biomédicales de Yaoundé 2013.144p
6. World Health Organisation. Protection of the Health of Workers.1 April 2014. Available: <http://www.who.int/mediacentre/factsheets/fs>
7. Ngahane B H M, Luma H, Ndiaye M, Njankouo Y M, Mbahe S, Wandji A, et al. Prévalence du tabagisme chez le personnel de l'Hôpital Général de Douala, Cameroun. *Pan Afr Med J*. 2012;11:25
8. Badri F, Sajjai H, Amro L. Prévalence du tabagisme chez le personnel médical et paramédical du CHU Mohamed VI ? Marrakech. *Pan Afr Med J*. 2017;26:45.
9. Almairac M. Activité physique du personnel hospitalier: étude dans 2 hôpitaux du Nord Pas-de-Calais [Thesis]. Nord-Pas-de-Calais:Faculté de Médecine Henri Warenbourg.2012;105p .
10. Ameera A A N, Abdulhussain A A A, Wood D. The Prevalence of Cardiovascular Disease Risk Factors among Employees in the Kingdom of Bahrain between October 2010 and March 2011: A Cross-Sectional Study from a Workplace Health Campaign. *CRP*. 2014;2014:9.
11. Sanjeev-Kumar-Gupta D S, Manju Vatsa, Ramakrishnan L, Kumar B V, Sanjeev K G et al. Study of cardiovascular risk factors among tertiary hospital employees and their family. *IHJ*. Jul 2012;64(4):356-363.
12. Toba K G S, Seyyed A J, Hamid S. Prevalence of Cardiovascular Risk Factors among the Nurse Population in the East of Iran. *IJTMGH*. 2015;3(4):133-6.
13. Kouassi B, Kpebo O D, Horo K, N'Gom A, Godé C, Ahui B, et al. Tabagisme et niveau d'instruction en milieu africain. *Rev Mal Respir*. Mar 2010;27(3):226–31.
14. Keita B. Obésité chez le personnel du CHU de Gabriel Toure [Thesis]. Université de Sciences des Techniques et des Technologies de Bamako; 2011:9p.
15. Tachfouti N, Berraho M, Boutahiri N, Nejjari C. Estimation du risque cardiovasculaire chez le personnel hospitalier à MEKNES. *Rev Marocaine Santé Publique*. 2014;1(1)12p.
16. Jackson R, Chambless L, Higgins M, Kuulasmaa K, Williams O D, Gender differences in ischaemic heart disease mortality and risk factors in 46 communities:an ecologic analysis.*Cardiovascular risk factor*,1997;7:43-54.

## AUTHORS' CONTRIBUTIONS

Study conception: SNA, LEE. Study design: SNA, LEE, AMJ, JB, LMK. Data collection: SNA, LEE, AMJ, DD, CNO, BJ, LMK, BH, AM. Data analysis and interpretation: SNA, LEE, DD, AMJ, BH, BJ, LMK, AM. Drafting of the manuscript: SNA, LEE, AMJ, and DD. All the authors critically read and approved of the final draft for publication.

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