

Original article

Blood pressure in the Congolese adult population of South Kivu, Democratic Republic of Congo: Preliminary results from the Bukavu Observ Cohort Study

Pression artérielle chez l'adulte congolais du Sud-Kivu, République démocratique du Congo : résultats préliminaires issus de la cohorte Bukavu Observ Study

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Abstract

Background. – Providing factual data about non-communicable diseases (NCDs) is of utmost importance in the sub-Saharan African countries where NCDs and arterial hypertension data remain scattered, scarce, and less representative given the region's heterogeneous population. Within this context, the interuniversity cooperation VLIR-UOS/Catholic University of Bukavu (Democratic Republic of Congo) has established an integrated project for monitoring hypertension and cardiovascular risk factors in the population of South Kivu. The aim of the study was to present the basic results of the determinants of blood pressure in the cohort studied.

Methods. – In 2013 and 2014, trained interviewers collected the anthropometric parameters, blood pressure, and medical history of 7405 adults (3060 in urban areas and 4345 in rural areas) including 3162 males and 4243 females; the cohort is expected to be followed for 9 years.

Results. – The average age of the entire group was 33.0 ± 16.7 years. Compared to men, women had significantly higher obesity indices ($P < 0.0001$), lower blood pressure between 20 and 39 years of age ($P < 0.0001$) but higher blood pressure at 60 years of age and older ($P < 0.0001$). Blood pressure was positively correlated with body mass index, waist circumference, and paradoxically with consumption of vegetables, but negatively correlated with the consumption of fruit, intense physical activity, and relaxation at home.

Conclusions. – These results show that a cohort study is feasible in the Democratic Republic of Congo. The factual data analysis can contribute to health policy orientation and setting up of preventive measures. Since most correlated risk factors are preventable, recommendations can already be made in the fight against high blood pressure in this population.

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Keywords: Blood pressure; Observ Study; South Kivu; Democratic Republic of Congo

Résumé

Position du problème. – Disposer de données en temps réel sur l'état de santé des populations peut contribuer à mieux documenter les maladies non transmissibles en Afrique subsaharienne où les données concernant ces affections demeurent éparpillées, insuffisantes et non généralisables en raison de l'hétérogénéité de la population de la région. Afin de contribuer à cet objectif, la coopération interuniversitaire VLIR-UOS/université

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catholique de Bukavu a établi un projet d'observatoire intégré de l'hypertension artérielle et des facteurs de risque cardiovasculaires dans la population du Sud-Kivu. L'objectif de ce travail est de présenter les premiers résultats issus de la cohorte mise en place concernant les déterminants de la pression artérielle.

Méthodes. – Entre 2013 et 2014, des enquêteurs entraînés ont recueilli les paramètres anthropométriques, la pression artérielle et l'histoire médicale de 7405 adultes (3060 en milieu urbain et 4345 en zone rurale), dont 4243 étaient des femmes et 3162 des hommes. La cohorte sera suivie pendant 9 ans.

Résultats. – La moyenne d'âge des individus inclus était de $33,0 \pm 16,7$ ans. Comparées aux hommes, les femmes avaient des indices d'obésité significativement plus élevés ($p < 0,0001$), une pression artérielle plus basse entre 20 et 39 ans ($p < 0,0001$) et plus élevée à 60 ans et plus ($p < 0,0001$). La pression artérielle était corrélée positivement à l'indice de masse corporelle, au tour de taille, à la consommation de légumes, et négativement à la consommation de fruits, à l'activité physique intense et à la détente à domicile.

Conclusions. – Ces premiers résultats encourageants montrent qu'une étude de cohorte est faisable en République démocratique du Congo. Des recommandations peuvent déjà être formulées pour lutter contre l'hypertension artérielle dans cette population.

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Mots clés : Pression artérielle ; Étude Observ ; Sud-Kivu ; République démocratique du Congo

1. Background

Several determinants can explain variations in blood pressure. For example, it is common to see a gradual rise in blood pressure with age [1]. Similarly, blood pressure is generally lower in women than in men during the reproductive years and increases more rapidly in the postmenopausal period [2]. Blood pressure also rises as a function of body mass index (BMI) [3].

Other determinants of high blood pressure are stress [4], excessive intake of salt [5] and alcohol [6], and a sedentary lifestyle. In contrast, various healthy behaviors are fairly good for low blood pressure. These include the consumption of fruits and vegetables [7,8] as well as regular exercise [9].

It follows that the combination of one or more determinants of elevated blood pressure and genetic factors result in an intermediate phenotype that is the stimulation of one or more neurohormonal systems (sympathetic, renin-angiotensin, endothelin) [10]. The consequence is either the increase in peripheral vascular resistance, cardiac output, or both. Ultimately, hypertension develops [10].

Hypertension is currently a major risk factor for morbidity and cardiovascular mortality, especially in the sub-Saharan Black African subject [11–13]. Unfortunately, in this region the data on non-communicable diseases are insufficient and unrepresentative. Therefore, recommendations are needed [14,15].

In the province of South Kivu, in eastern Democratic Republic of Congo, the prevalence of high blood pressure is high in both urban and rural areas [16]. Since 2013 in this province, the interuniversity cooperation between VLIR-UOS and the Catholic University of Bukavu has successfully recruited a cohort of adult subjects to be followed for 9 years. The overall objective of this project is to establish integrated monitoring of hypertension and cardiovascular risk factors in the population of South Kivu to allow the subsequent implementation of control strategies against these risk factors.

The present report gives the basic results of the determinants of blood pressure in this cohort.

2. Methods

2.1. Study design and population

An observatory to provide physical and continuous data on changes in the prevalence of non-communicable diseases, particularly arterial hypertension, has been established at the Catholic University of Bukavu Medical School in collaboration with Ghent University in Belgium (Bukavu Observ Study). The coverage area of the observatory is the province of South Kivu, in eastern Democratic Republic of Congo. The urban survey was conducted in an urban site in the city of Bukavu (Irambo street [with an estimated 8027 inhabitants] in Nyalukemba district, Ibanda township) and a rural site (Ciranga village [with an estimated 8765 inhabitants] in the rural Katana zone 45 km from Bukavu). All adult subjects aged 15 years (50% of the population) or older, of both genders, living in these sites were asked to participate and their verbal informed consent was obtained. For subjects absent from the household at the first visit, a subsequent appointment was solicited. Thus, all subjects who consented constituted the cohort to be followed for 9 years. The survey will be repeated every 3 years (three cycles). At the end of the first cycle of the survey, 2418 households (817 in urban areas and 1601 in rural areas) were visited in which 7405 adults were found (3060 in urban areas and 4345 in rural areas). A total of 197 (2.7%) subjects declined to participate in the study. The acceptance rate was 97.3%.

The study was approved by the ethics committee of the Bukavu Catholic University Medical School (*comité d'éthique de l'université catholique de Bukavu* no. 011/2012). Informed consent was obtained from all patients included in the study.

2.2. Data collection

The first cycle of the survey took place from 1 November 2013 to 30 March 2014. Data collection was based on a systematic sampling method, including all the resident population at the time of data collection. Teams of trained investigators visited the participants at their home, combining the administration of a questionnaire and physical

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