



## PREVALENCE OF CARDIOVASCULAR RISK FACTORS IN RURAL AREAS: CASE OF KARUSI PROVINCE

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### ABSTRACT

**Background:** There are few Burundian data available on cardiovascular risk factors.

**Aim:** To determine the prevalence of cardiovascular risk factors in rural area of Burundi.

**Patients and methods:** This was a survey carried out during the celebration of World Heart Day at the "Natwe Turashoboye" hospital in the province of Karusi. We systematically recorded anyone who came for voluntary assessment of cardiovascular risk factors or cardiovascular disease.

**Results:** A total of 580 people participated in the survey. High blood pressure was the leading cause with 48.2% of cases (n=280), abdominal obesity with 17.8% (n = 91), diabetes with 9% (n = 48) and tobacco with 7.2% (n = 42). The discovery of high blood pressure was fortuitous in 38.9% of cases. At the time of hypertension's diagnosis, 38.2% of cases were already at stage II according to the World Health Organization's classification of hypertension.

**Conclusion:** The frequency of cardiovascular risk factors was high. These were classic risk factors and the high blood pressure was by far the most common factor. Prevention as well as early diagnosis would be an asset in the fight against cardiovascular diseases in Burundi.

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## INTRODUCTION

Cardiovascular diseases (CVD) with their risk factors have become a real health problem in Africa [1]. They are the leading cause of death in the world [1, 2]. Some risk factors are unavoidable and others are preventable [1]. Obesity, high blood pressure, diabetes mellitus and high cholesterol are the main risk factors [3]. A STEPS survey, the first of that kind in Burundi carried out in Kirundo province, determined the prevalence of hypertension at 25.2% [4]. The objective of this study is to determine the prevalence of cardiovascular risk factors in rural areas of Burundi.

### Patients and methods

#### Design, setting and study population

This was a survey on cardiovascular risk factors in rural areas in Burundi. The choice of the place of the study had been decided during an ordinary meeting of the committee of the Burundian society of Cardiology (BSC) on the occasion of the celebration of the international heart day on September 28, 2018. Thus, we had decided to carry out the study in the center of the country in the premise of the national hospital "Natwe turashoboye" in the province of Karusi. The screening had done by qualified personnel (cardiologists, all members of the BSC). The participants who made up our study population

were invited by advertisement to churches in Karusi province one week before the survey.

#### Collection of data

We systematically tracked down anyone who responded to our invitation. Hospitalized patients and those patients who had come for a consultation for health problem were excluded from our survey. The recorded data were administrative, weight, height, body mass index (BMI), waist circumference, blood pressure and capillary blood glucose. Quantification of alcohol and tobacco consumption, family history, and physical activity were also systematically recorded. Were considered as hypertensive, respondents receiving an antihypertensive treatment and respondents who were not receiving antihypertensive treatment but presenting a blood pressure greater than or equal to 140/90 mm Hg [5]. Abdominal obesity was defined as a waist circumference greater than 102 cm in men and 96 cm in women according to the thresholds of the National Cholesterol Education program ATP III and a BMI > 30 kg/m<sup>2</sup> [6].

#### Data analysis

The data collected, on previously established sheet and systematically completed during the screening of each participant, had been entered, cleaned and validated using

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Microsoft Excel software. These data had been analyzed by IBM SPSS, version 20. Pearson's statistical test and  $\chi^2$  were used with  $P < 0.05$ . The data had been presented in tabular form, percentage, and mean with standard deviation.

### Ethical consideration

We had first received authorization from the ethics committee of the faculty of medicine and the Kamenge university hospital. The administrative authorities of Karusi had also given their consent. The vents was sponsored by the Ministry of Public Health and Fight against Aids. The whole process of investigation had been explained in detail to participants. The consent to publish results had been obtained from participants.

### RESULTS

A total of 580 participants formed the simple of our study. Of these, 66.9% (n = 388) were female and 33.1% (n = 192) were male. The mean age was  $44 \pm 16.3$  years with extremes of 15 and 85 years. The peak in participants was observed in the 30 – 44 age group with 28.9% (n = 168). The participants who came from the Karusi province were 98.2% (n = 570). The other 1.7% came from the neighboring province of Gitega. Concerning levels of study, 46.3% (n = 269) had not attended school. Those who had attended primary school followed with 27.2% (n = 158). Famers were the most numerous with 75.8% (n = 440).

Blood pressure was found in 48.2% of participants (n = 280). Among them, 73.5% (n = 206) had an elevated pressure, 26.4% (n = 74) had stabilized hypertension and 38.9% (n = 109) did not know their hypertensive history. Based on the world health organization's classification of hypertension, 38.2% (n = 107) were in stage II, 25% (n = 70) in stage III and 36.7% (n = 103) in stage I. grade II predominated (table 1).

**Table 1** Distribution of participants according to age and class of hypertension

Age Classification	[15 – 30]	[30 – 45]	[45 - 60]	[60 - 75]	[75 - 85]	Total	Percentage
Hypertension Grade I (mild)	11	32	34	23	3	103	36.7
Hypertension Grade II (moderate)	8	32	38	24	5	107	38.2
Hypertension Grade III (severe)	1	19	26	17	7	70	25.0
Total	20	83	98	64	15	280	100

The blood glucose test involved 531 participants. The other 39 participants didn't the test because of the lack of test strips. Among them, 7.7% (n = 41) had a capillary glycaemia  $\geq 7$  mmol/l for the first time and 1.3% (n = 7) knew that they were diabetic. Thus, there were 9% of diabetics (n = 48). Among those 48 diabetics, 45.8% (n = 22) had associated hypertension.

Waist circumference was measured in order to find out abdominal obesity. It was performed in 510 participants with 67.3% (n = 345) of women and 32.3% (n = 165) of men. Among them, 16.4% (n = 84) were women and 1.3% (n = 7) were men. Regarding tobacco and alcohol consumption, 7.2% were active smokers (30 women and 12 men); 36% of participants (n = 116) said that they were alcohol users but we couldn't estimate the amount of consumption. Sedentary lifestyle was evaluated in non-farmers, i.e. 24.1% of participants (n = 140). Of these, 80% (n = 112) didn't do any physical activity while 20% (n = 28) said that they regularly did sports and/or physical activity at least three times a week. The main risk factors were hypertension (table 2).

**Table 2** Distribution of participants according to cardiovascular risk factors

CVRF	Effective	Number of cases	Percentage
Hypertension	580	280	48,27
Diabetes	531	48	9
Abdominal obesity	510	91	17,8
Tobacco	580	42	7,2

CVRF: cardiovascularrisk factor

### DISCUSSION

#### Limits and constraints of our study

The screening of cardiovascular risk factors was done in "Natwe turashoboye" hospital after that the event was announced in churches of the Karusi province. That could led to an overestimation of the number of cardiovascular risk factors. Indeed, the majority of the population are Christians and therefore, people already with a known cardiovascular disease problem and those who had any discomfort came for screening. Despite these limitations, we were able to compare our results with those of other authors.

#### Overall results

**Sociodemographic data:** Our sample consisted of 580 participants and among them, 66.9% (n = 388) were female and 33.1% (n = 192) were male. This female predominance can be explained by the fact that women respond more easily to mass calls. Pessinamba S *et al.* and Nathan DM *et al.* in Senegal [1, 6] had made the same observation. The mean age of participants was  $44 \pm 16.3$  years with extremes of 15 and 85 years. The peak in participants was observed in the 30 – 44 age group with 28.9% (n = 168). These results reflect the character of the African population which is relatively young. Pessinaba S *et al.* [7] found  $43.4 \pm 17.8$  years, Mohtadi *et al.* [1], in Casablanca in Morocco, found  $54.47 \pm 10.89$  years. They were came from the Karusi province were 98.2% (n = 570). The other 1.7% came from the neighboring province of Gitega. Concerning levels of study, 46.3% (n = 269) had not attended school. Those who had attended primary school followed with 27.2% (n = 158). Famers were the most numerous with 75.8% (n = 440).

#### Different found cardiovascular risk factors

This survey allowed us to obtain additional data on the prevalence of cardiovascular risk factors in a Burundian rural areas (table 2).

Cardiovascular diseases are the leading cause of death worldwide and among them, hypertension is the most implicated. Indeed, the burden of high blood pressure is greater in low-income countries [8]. The prevalence of hypertension in the general population differs according to the studies and the places of study (rural or urban, professional or not). Boukli Hacène L *et al.* [9], in Algeria in 2007, found that the prevalence of higher in urban areas (28%) than in rural areas. Ndirahisha E *et al.* [10], in their study on hypertension in professional area in Burundi, found a prevalence of hypertension at 27.7%. In our survey, the frequency of high blood pressure was 48.2% of participants (n = 280). Our results are close to those found by Pessinaba S *et al.* [1] with 46% of cases and Mbaye *et al.* [11]. They were superior to those found by Yayehd *et al.* [12] with 36.7%, Mohtadi *et al.* [7], Merle *et al.* [13] in Martinique with 29%, Atallah V *et al.* [14] in an Afro-Caribbean population of Saint Martin with 27.9%. Among those participants with high blood pressure, 73.5% (n = 206) had an elevated pressure, 26.4% (n = 74) had

stabilized hypertension and 38.9% (n = 109) did not know their hypertensive history. An equivalent rate had been found by Pessinaba S *et al.* [1] in Senegal with 50% of cases. This lack awareness of the existence of hypertension may be related to the silent nature in its evolution. This situation may explain why most patients consult with complications. Preventive and curative management of hypertension is still sub-optimal in Sub-Saharan Africa. This can be explained by the lack of resources, effective preventive strategies and appropriate curative hypertension, and therapeutic non-compliance [8]. According to World Health Organization classification of hypertension, 38.2% (n = 107) were in stage II (See table 1). Thus, we can consider that hypertension was insufficiently detected, controlled and poorly monitored.

The prevalence of diabetes was 9%. This rate is comparable to that of most authors [1, 11, 14]. Indeed, Atallah V *et al.* [14] found 8%, Pessinaba *et al.* [1] found 10.4% and Mbaye A *et al.* [11] found 7.2%. According to STEPS survey in the Africa region [15], countries with the highest prevalence of diabetes are Congo with 21%, Liberia with 19%, Algeria and Swaziland with 15% each. After Togo, the countries with the lowest prevalence are Guinea, Mozambique and Zanzibar with 4% each.

Abdominal obesity varies widely depending on the definition used. According to Pessinaba s *et al.* [1] found 33.2% using the "International Cholesterol Education Program" definition and 48.7% using the "International Diabetes Federation" definition. Mbaye *et al.* [11] found 53.9% using the "International Diabetes Federation" definition. In our survey, abdominal obesity was found in 17.8% of participants [4]. The socio-demographic characteristic of our sample could be the cause for this low obesity rate (population mainly composed of farmers (75.8%)).

Sedentary lifestyle was evaluated in non-farmers, i.e. 24.1% of participants (n = 140). Of these, 80% (n = 112) were sedentary while 20% (n = 28) did physical activity at least three times a week. The recommendations of the World Health Organization in 2011 [16] for physical activity are such that 150 minutes of endurance activity with moderate intensity or at least 75 minutes of endurance activity with supported intensity for adult person should be spent daily.

## CONCLUSION

The frequency of cardiovascular risk factors was high in rural area in Burundi. These were also the classic risk factors (high blood pressure, diabetes, obesity, tobacco, alcohol abuse). By far the most common factor was high blood pressure. Prevention as well as early diagnosis would be an asset in the fight against cardiovascular diseases in Burundi.

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## Conflict of interest

The authors declare no conflict of interest.

## Contributions from the authors

Eugene Ndirahisha and Guy Mugisha designed the study, performed the data collection, analysis and wrote the

manuscript. All authors have read and approved the final manuscript.

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