



HIGH BLOOD PRESSURE IN A PROFESSIONAL ENVIRONMENT IN LOW INCOME COUNTRY: CASE OF THE MOSO SUGAR COMPANY IN BURUNDI

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ARTICLE INFO

Article History:

Received 4th October, 2019

Received in revised form 25th

November, 2019

Accepted 18th December, 2019

Published online 28th January, 2020

Key words:

High blood pressure, cardiovascular risk factor, professional environment, Burundi

ABSTRACT

Aim: To determine the prevalence of high blood pressure in the Moso sugar company in East of Burundi.

Methodology: This is a cross-sectional study among workers of Moso Sugar Company from May to August 2018. Any agent of the company with high blood pressure, consenting to participate after some clarified explanations and working at least five in the company was included in our protocol. For each participant, we took three measurements of systolic and diastolic blood pressure and calculated the average that we reported. Only hypertensive patients made up our simple. Cardiovascular risk factors were also investigated.

Results: Of 535 workers, 352 agreed to participate in the study and among them 96 had high blood pressure, representing a frequency of hypertension of 27.7%. The average age was 50.52 years with extremes from 28 to 61 years and a sex ratio of 2.4 in favor of men. Seventy two respondents (75%) were at stage II according the WHO classification of hypertension. Eighty one (83.3%) were simple workers and 5 (5.2%) had positions of responsibility. In addition to factors related to working conditions, the dominant cardiovascular factors were alcohol (68.7%), overweight and/or obesity (53.1%), diabetes (37.7%) and smoking (22.9%). Forty respondents (41.6%) complained of at least neurosensory signs and were at stage III of hypertension.

Conclusion: the prevalence of high blood pressure is high in Moso Sugar Company. An awareness and care campaign is necessary in this community.

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INTRODUCTION

High blood pressure (HBP), by its frequency and its complications, is a public health problem [1]. Stress, related to extreme working conditions in a sugar cane factory (noise, high temperature, dust ...) can lead to HBP [2, 3]. In 2003, Chobanian and al. [4] estimated that around one billion people worldwide suffer from HBP and this number would increase with the aging of population. In addition, HBP is unevenly distributed across continents, countries and region [3]. So, 15% of French populations, 20% of American population and 18% of Chinese population are affected by hypertension [3]. Some authors reveal high prevalence of HBP among workers in Africa and in industrialized countries [5-7]. The aim of this study is to determine the prevalence of HBP and to identify the related cardiovascular factors in workers who are permanently exposed to noises from processing machines or noises from cane cutting, dust and other nuisances from the factory of Moso Sugar Company.

Patients and methods

This is a cross-sectional descriptive study among workers of Moso Sugar Company from May to August 2018. The company is located in the east region of Burundi. Only hypertensive workers with at least five years' service were eligible to participate in the survey. In data collection, we used a semi-structured questionnaire on socio-demographic characteristics, clinico-para clinical signs and treatment.

A body mass index (BMI) was calculated as the ratio of weight (in kilograms) to the square of height (in meters) [8]. Persons with a BMI between 25 and 30 were considered as overweight and those with a BMI > 30 kg/m² were classified as obese. We recorded blood pressure by means of an electronic device (OMRON Hem8402) on the two arms supported at the heart level. The measurement was repeated three times and we kept the average. The respondent rested for at least 15 minutes in a seated position. According to the 2013 recommendations of the European Society of Cardiology [9], we took as

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hypertensive any respondent whose systolic blood pressure was greater than or equal to 140 mm Hg and/or the diastolic pressure greater than or equal to 90 mm hg or all respondent under antihypertensive treatment. Only hypertensive patients made up our sample.

For ethical reasons, we have obtained written authorization from the local administration and from the General Director of Moso Sugar Company. Participation in the survey, for each worker of the company, was voluntary after an informed explanation from the investigator. The files were stored manually. Data entry, processing and analysis were done by using Word, Excel and IBM SPSS statistics 20 softwares.

RESULTS

Among 535 workers of Moso Sugar Company, 352 agreed voluntary to participate in the study, for a participation rate of 65.7%. The number of hypertensive patients was 96, whether a prevalence of 27.7%. The average age of hypertensive patients was 50.52 years with extremes of 28 and 61 years. Seniority at work was 15 ± 3.8 years and the average working time was 8 hours per day, except for on-call days. Men predominated with 70.83% of the cases and the sex ratio was 2.4 in favor of men. The distribution of hypertensive patients by age group and sex is shown in the table below.

Table I distribution of hypertensive patients by age group and sex

Age group (years)	≤ 30	31 - 40	41 - 50	51 - 60	> 60
Femmes	1 (1%)	5 (5.2%)	19 (19.7%)	3 (3.1%)	0 (0%)
Homes	0 (0%)	1 (1%)	15 (15.6%)	51 (53.1%)	1 (1%)
Total	1 (1%)	6 (6.2%)	34 (35.4%)	54 (56.2%)	1 (1%)

Women were majority in the 41 to 50 age group, or 19.79%. Educational attainment was low with 75% for secondary school, 8.3% for primary school and 16.6% for academics. Cardiovascular risk factors were dominated by alcohol consumption, a family history of cardiovascular disease and diabetes (Table II).

Table II Distribution of patients according to cardiovascular risk factors

CRF*	Number (n = 96)	%
Alcohol	66	68.7
Family history of cardiovascular disease	40	41.6
Diabetes	36	37.7
Overweight	30	31.2
Tobacco	22	22.9
Obesity	21	21.8

CRF*: cardiovascular risk factor

The functional signs were mainly neurosensory: headache (41.6%), dizziness (32.2%), visual disturbances (27.0%), ringing in the ears (11.4%), insomnia (11.4%) and paraesthesia (2.0%). Palpitations and dyspnea were observed in 30.2% and 7.2% of cases. The average BMI was 27.34 kg/m² with extremes of 20 and 38.9 kg/m². Forty five patients (46.87%) had normal weight. The overweight patients were 31.25% and the obese were 21.87%; according to the grades, HBP was classified stage I in 23 cases (23.9%), stage II in 32 cases (33.3) and stage III in 41 cases (42.7%).

DISCUSSION

According to O'Brien E and al., the diagnosis of HBP, based on ambulatory blood pressure measurement, should be used before the start of treatment for HBP [10]. In Burundian context, this practice is almost impossible for vast majority of the population and in our specific case, we found our respondents in their workplace.

Our main objective was to determine the prevalence of HBP and to identify cardiovascular risk factors in Moso Sugar Company workers. As in Kabamba Ngombe L's study [3], the limits of our study were the limited number of factory's agents (535 in al for all), the discrimination imposed by extreme working conditions in favor men that leads to the male domination in this area. The method of taking blood pressure in a single visit, even if it was repeated more than 3 times was also part of our work limitations.

According to the literature, stress caused by noise and other nuisances in factories increases the frequency and complications of HBP [2, 3, 5]. In our study, we found a HBP's frequency of 27.7%. In sub-Saharan Africa, the frequency of HBP is generally high and especially in the urban population who have many cardiovascular risk factors [1, 5, 11]. It is even higher in workplace where agents are exposed to noise and other nuisances.

Indeed in DR Congo, Katchunga PB found it at 41% in urban areas and 38% in rural areas among the Congolese population in the province of South Kivu in 2011 against 49.3% among millers in 2015 [3]. Koffi NM and al. [12], in the Ivory Coast in 2001, had found a prevalence of 29.7% which largely exceeded that estimated at 13.4% by Comoé and al. in general population of Abidjan in 1993. In 2006, among the inhabitants of Addis Ababa, the prevalence of HBP was 50.9% of men and 47.1% of women [13]. In fact, studies carried out in the workplace indicate that the prevalence of HBP depends on the occupation and working conditions [12].

Among the non modifiable risk factors, it is known that the risk of developing hypertension becomes frequent and increases massively with age. Thus, the most represented age group in our study was that of 51 to 60 years with 56.2% of cases.

The modifiable risk factors related to HBP were in accordance with the data in literature [1-3, 5, 12, 14, 15]. In fact, we recorded alcohol abuse, diabetes, smoking and obesity respectively in 68.7%, 37.7%, 22.9% and 21.8%. all these factors are well documented in the literature and yet they are still poorly understood in developing countries and more particularly in Burundi.

The prevalence of alcoholism in our study is higher than that found by Kabamba Ngombe L and al. [3]. According to Dyer AR and al. [16], the correlation between alcohol and blood pressure is a continuous relationship with no threshold. On the other hand, some authors reveal a threshold below which a low consumption would not raise the blood pressure but would tend to make it decrease [17, 18]. Indeed, a high frequency of hypertension in persons with heavy alcohol consumption confirms the association between alcohol and blood pressure.

Tobacco, overweight and obesity were independent cardiovascular risk factors but could not explain one at one this high frequency of HBP. It would be explained by difficult working conditions. Indeed, continuous or prolonged exposure to the noise leads to HBP according literature [2, 3].

The work environment at Moso Sugar Company indicates that workers in this factory are exposed to noise and vibration permanently which are generated by engines and other equipment for producing sugar. Other sources of nuisance are dust and soot during cutting of sugar cane, heat in the interior of the factory due to lack of space or lack of adequate ventilation. The lack of personal protective equipments is another factor that contributes to the creation and maintenance of stress that surely affects the health of the factory workers.

CONCLUSION

The prevalence of HBP is very high in the Moso Sugar Company. The main risk factors associated with hypertension are high alcohol consumption, permanent extreme working conditions (noise, stress, dust, heat...), history of cardiovascular disease in the family, diabetes, overweight and obesity. Preventive awareness and care campaigns are necessary in this community. In addition, bringing specialist care closer would be beneficial for this isolated population in comparison to the urban population.

Conflict of interest

The authors have no conflict of interest to declare. Also there are no sources of funding to declare.

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