

Special Article – High Blood Pressure

High Blood Pressure in Workers of Borgou Departmental Teaching Hospital (Benin): Prevalence and Contributing Factors

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Abstract

Introduction: Hypertension is one of the risk factors of cardiovascular diseases.

Objective: Study the frequency of High Blood Pressure (HBP) and contributing factors in workers of Borgou Departmental Teaching Hospital (CHUD/B).

Methods: It was a cross-sectional, descriptive and analytical study, conducted over three months (1st July to 30th September 2013) and targeted the whole CHUD/B staff members aged 18 years and above. The study population was 373 workers. We sought the contributing factors through a questionnaire providing clinical and behavioral data. Data analysis was carried out in Epi-info and KH12 test was used to compare the proportions with a statistically significant difference for $p < 0.05$.

Outcomes: The population mean age was 37 years \pm 9 years. Sex-ratio was estimated at 0.86. The prevalence of respondents with blood pressure $\geq 140/90$ mmHg was 27.10%. The respondents with personal history of hypertension recorded 10.20%. Furthermore, 110 CHUD/B workers or 29.49% had High Blood Pressure and/or a personal history of hypertension. High Blood Pressure was statistically associated with age ($p=0.0124$), marital status ($p=0.0016$), seniority in job position ($p=0.0008$), tobacco use ($p=0.03$), personal history of hypertension ($p=0.000$), personal history of diabetes ($p=0.000$) and family history of hypertension ($p=0.020$).

Conclusion: HBP frequency is significant in CHUD/B workers. There is need for better prevention of risk factors to contribute to mitigating cardiovascular diseases morbidity and mortality.

Keywords: High blood pressure; Workers; Prevalence; Parakou

Introduction

Hypertension is one of the major causes of cardiovascular disease (CVD) across the world [1]. In sub-Saharan Africa, hypertension is a risk factor of heart failure and stroke [2]. The prevalence of hypertension varies from one continent or country to another [1]. Globally, it affects approximately 20% of the world population [1]. In Africa, 20 million people are affected, with a prevalence of 10% to 35% varying according to the country [3,4]. In Benin, the prevalence of high blood pressure (HBP) has varied from 20.2% in 2001 to 27.5% in 2008 [5]. Hypertension morbidity is on the rise because of its close association with other risk factors such as diabetes, obesity, dyslipidemia. Stress, lack of sleep and diet are also causes of high blood pressure. However, health workers are working in such an environment. This study was initiated in 2013 to study the frequency of HBP and the contributing factors in workers of Borgou and Alibori Departmental Teaching Hospital (CHUD/B-A).

Study framework and methods

The study was conducted in Borgou and Alibori Departmental Teaching Hospital (CHUD/B-A) located in the District of Parakou in northern Benin. It was a cross-sectional descriptive and analytical

study conducted among health workers, over a period of three months, from 1st July to 30th September 2013. The study included all workers aged 18 years and above, present and selected on voluntary basis, with their informed consent. Those excluded from the study were all individuals unable to respond to the questions or the patients admitted during the study period, including pregnant women and workers who declined to participate.

It was a complete and thorough sampling protocol including all workers meeting the inclusion criteria. However, a minimum population size of 338 individuals was selected through Schwartz formula, from a prevalence of 27.5% HBP reported by the Benin Health Ministry survey and regarded as baseline [6]. The workers enrolment method was voluntary-based. Screening activities were carried out during working days in the morning, and based on the participant's convenience.

High Blood Pressure (HBP) is the key dependent variable. All individuals with systolic blood pressure (SBP) ≥ 140 mmHg and/or diastolic blood pressure (DPB) ≥ 90 mmHg on the survey day are considered as having HBP. The secondary dependent variable is known HBP. Any individual with a history of hypertension

(confirmed by a health officer), under antihypertensive therapy or not, is considered as hypertensive. It is a binary variable coded as yes or not. The independent variables included socio-demographic factors (age, sex, marital status and profession) diabetes mellitus medical history, clinical variables (weight and height gain with BMI calculation) and behavioral habits information (tobacco, alcohol and physical inactivity). The individual blood pressure was taken while in sitting position after 15 minutes rest with a fully automatic digital upper arm blood pressure monitor validated by the French Society of Hypertension. It was measured in the bare right arm, lying on a table, and palm upwards. For each individual, three measures were taken at five minutes intervals and the average of the last two measures is the final blood pressure selected. Blood pressure is considered high when it is greater than or equal to 140/90mmHg. HBP was classified by stage according to the WHO classification. Physical activity is considered light when it is done at most once weekly for a duration below 30 minutes, moderate when it is done once or twice weekly for at least 30 minutes and intense when it is at least 3 times weekly for an average duration of 30 minutes per session. BMI was calculated by dividing the weight (kg) by height squared (m^2). BMI threshold greater than or equal to $30\text{ kg}/m^2$ is defined as obesity, while overweight is considered when the threshold is between 25 and $30\text{ kg}/m^2$, normal BMI ranges from $18.5\text{ kg}/m^2$ to $24.9\text{ kg}/m^2$ and underweight is defined by a value below $18.5\text{ kg}/m^2$. Both overweight and obesity include body fat. Information on work-related stress was provided through a declaration. More so, information on the use of tobacco in all its forms was provided through a declaration.

Data collection technique was a well-structured personal interview with the respondent and direct measuring of physical parameters after his/her oral informed consent. The data collected were entered through Epi Data 3.1 French version, and data analysis was carried out using Epi Info 3.5.1-2008 version. The mean values are presented with their standard deviation. The comparison of the two proportions is performed using unadjusted chi-square test. For any probability below 5% ($p < 0.05$), an association is statistically significant between two variables.

Outcomes

General characteristics of the respondents

Description of the study population: In total, 373 health workers took part in the study. This figure included 201 (53.89%) females representing 0.86 as sex ratio. The mean age was 37 years \pm 9 years (extreme values of 19 and 57 years). The most represented age group was 25-34 years. The respondents' seniority ranged from 1 to 33 years with 10 ± 6 years as mean value, and seniority in job position ranged from 1 to 30 years with 10 ± 5 years as mean value. Table 1 highlights the distribution of the respondents according to sex, age, profession, marital status, seniority, seniority in job position and the distance from the respondent home to his/her workplace.

Behavioral and clinical characteristics: In our series, 40 CHUD-B workers (10.72%) were tobacco users. With regard to medical history, nine respondents (2.4%) were type II diabetic patients. Among the diabetic patients, three respondents (33.3%) were affected over five years ago and four (44.4%) were under therapy. Family history of hypertension, diabetes and heart failure were recorded respectively in 123 (33.0%), 67 (18.0%) and 7 (2.0%) workers.

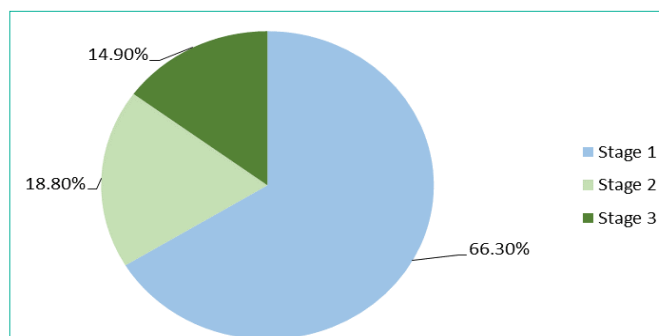


Figure 1: HBP prevalence per stage in CHUD Borgou workers in 2013.

As regards body mass index (BMI), 142 respondents were overweight i.e. 38.1% and 103 obese i.e. 27.6%. Therefore, overweight was recorded in 245 participants representing 65.7%. In fact, 199 respondents (53.4%) practiced no physical activity weekly. Only eight respondents (2.1%) engaged in intense physical activity for at least 30 minutes, three times or more weekly. Table 2 highlights respondents' distribution according to behavioral and clinical characteristics.

In the study, 38 workers were aware of their hypertensive status representing 10.2% prevalence of "known hypertension". Among these 38 health workers, 16.3% knew their status over 10 years ago whereas 86.3% knew their approximate BP the survey day. As regards therapy, 89.5% of hypertensive respondents who knew their status were under therapy during the survey. 74.5% of CHUD/B staff measured their BP over a year ago.

Frequency of HBP and hypertension

Among the 373 respondents, 110 had $SBP \geq 140\text{ mmHg}$ and/or $DBP \geq 90\text{ mmHg}$ and/or known hypertension, representing 29.4% prevalence of known HBP/hypertension. Based on the WHO stages of HBP, stage 1 was more represented with a proportion of 66.34% according to the respondents' distribution. Out of the 373 workers, 101 or 27.1% recorded $SBP \geq 140\text{ mmHg}$ and/or $DBP \geq 90\text{ mmHg}$ during the survey. The mean systolic blood pressure was $127.5\pm 16.7\text{ mmHg}$ and $78.6\pm 11.7\text{ mmHg}$ for diastolic blood pressure. Figure 1 shows HBP prevalence per stage.

Identifying factors associated with high blood pressure

Factors associated with HBP in CHUD Borgou workers in 2013: HBP was statistically associated with age ($p=0.0124$), marital status ($p<0.001$), seniority in job position ($p=0.0008$), tobacco use ($p=0.03$), personal history of hypertension ($p<0.001$), personal history of diabetes ($p<0.001$) and family history of hypertension ($p=0.020$). Table 3 represents the correlation between HBP and associated factors.

Factors not associated with HBP in CHUD Borgou workers in 2013: HBP was not statistically associated with sex ($p=0.9206$), profession ($p=0.2272$), level of education ($p=0.6438$), seniority, distance from home to workplace ($p=0.0791$), family history of diabetes ($p=.190$) and heart failure ($p=0.460$).

Discussion

Prevalence of high blood pressure

Our study is the first ever conducted on HBP among health sector

Table 1: Distribution of the study respondents according to sex, age, level of education, profession, marital status, seniority and seniority in job position.

	Study population (N=373)	Frequencies (%)
Sex		
Female	201	53.9
Male	172	46.1
Age (year)		
≤24	19	5.1
25-34	135	36.2
35-44	133	35.7
≥45	86	23.1
Level of education		
Illiterate	6	1.61
Primary school education	87	23.32
Secondary school education	219	58.71
Higher education	61	16.35
Profession		
Assistant nurse	58	15.5
Doctor	16	36.2
X-ray/ lab technician	27	7.2
Social worker	3	0.8
Administrator	16	4.3
Others	95	25.5
Marital status		
Married	308	82.6
Single	60	16.1
Divorced/ widow (er)	5	1.3
Seniority in the profession (year)		
≤9	198	53.1
20-Oct	153	41
≥21	22	5.9
Seniority in job position (year)		
≤9	245	65.7
20-Oct	120	32.2
≥21	8	2.1

workers in North-West Benin, and on this basis it provides basic data. Over one out of four staff member (27.1%) had HBP during the study. This result was similar to 27.5% prevalence recorded in Benin general population in 2008 and 27.9% observed in the Regional District of our study [7]. This frequency was higher than 16.1% recorded in 2005 in Mali by Coulibaly et al [8]. However, it is lower than 32.5% and 41.0% found respectively in Senegal and Gabon [9]. Behavioral change and lifestyle related to changes in diet patterns, lack of physical activities and significant work-related stress could account for these variations and differences in HBP prevalence from one region/country to another [9].

Factors associated with HBP

In our study, the mean age was 37 years ±9 years. The 25-34 years

Table 2: Distribution of the respondents according to clinical characteristics.

	Study population (n=373)	Frequency (%)
Smoking		
Yes	40	10.72
Diabetes		
Yes	9	2.4
Family history		
Hypertension	123	33.0
Diabetes	67	18.0
Heart Failure	7	2.0
BMI classification		
Underweight	4	1.1
Normal	124	33.2
Obesity	103	27.6
Overweight	142	38.1
Physical activity (PA)		
Not PA per week	199	53.4
Light PA	86	23.1
Moderate PA	82	22.0
Intense PA	8	2.1

age group was the most represented. Our mean age is similar to 36.6 years recorded in 2005 in Côte d'Ivoire [10]. A survey on the same theme was carried out in Benin North-East region in 2014, where the mean age was 42.55±14.6 years. [11]. The age gap is due to the fact that our research was held in a professional environment where the upper age limit cannot exceed 60 years in general, and 65 years for higher education lecturers, as the age is set by Benin Government for Civil Servants retirement.

The prevalence of HBP increased with age ($p=0,0124$). The correlation between HBP and age was significantly high. This fact corroborates the literature which indicates that the prevalence of hypertension increases steadily with age, due to natural aging of the arterial walls and the trend towards excessive salt intake [12]. The increased HBP prevalence with age varies from 16.39% in 25-34 years age group to 33.83% in 35-44 years age group. Other studies made the same observation [13,14].

Marital status is also correlated with the prevalence of HBP. Married couple recorded 30.4% prevalence whilst single individuals were in proportion of 10%. This variance could be explained by the steady progress of HBP prevalence according to age. Family caring responsibilities are very often disproportionate with the family resources, and this could also explain this increased HBP prevalence. Added to this are the stress involved in family issues management and professional constraints. Most single individuals about 25 years, were outside the age range associated with HBP.

In our series 10.72% of workers were tobacco users. This frequency was lower than 20% recorded in Borgou and Alibori population in Benin in 2014 by Ahoui et al. [11]. The low-size population could justify the low frequency of tobacco use, because the majority of our respondents are caregivers highly aware of the risks

Table 3: Factors associated with HBP in CHUD Borgou workers in 2013. (n=373).

	Total	HBP		p-value
		Study population (n)	Prevalence (%)	
Age (year)				0,0124
< 25	31	9	29.0	
25-34	122	20	16.4	
35-44	133	45	33.8	
≥ 54	87	27	31.0	
Marital status				<0.001
Single	60	6	10.0	
Married	313	95	30.4	
Seniority in job position (year)				<0.001
≤ 9	245	55	22.4	
10-20	120	40	33.3	
≥ 21	8	6	75.0	
Tobacco use				0.03
Yes	40	14	35.0	
No	333	85	25.5	
Family history of hypertension				0.020
Yes	124	42	33.9	
No	249	57	22.9	
History of diabetes				<0.001
No	368	94	25.5	
Yes	5	5	100.0	
Family history of hypertension				0.020
Yes	124	42	33.9	
No	249	57	22.9	

and consequences of tobacco. Tobacco known to be a cardiovascular risk factor constitutes in itself a risk factor of impairment of kidney function [15]. It could increase by 4 the risk of reaching stage 5 of acute kidney injury [11].

The increase is due to rise in sympathetic tone with increased rates of plasma noradrenaline. This upsurge in blood pressure lasts 15 to 20 minutes.

Among our respondents, 53.4% were physically inactivate on weekly basis. This frequency could be explained by the workload of CHUD/B-A workers. Neither the nights nor the shifts on weekends do not probably give them time to engage into self-care physical activity.

There were 103 obese among the 373 respondents, representing 27.6% prevalence. This prevalence was significantly higher than 11.89% recorded in the study region by Ahoui et al in 2014 [11]. This fact is evidently related to the high prevalence of physical inactivity recorded in CHUD/B workers.

Culture and eating habits which are very different in these countries could account for the gap in the figures. More so, the high figure of our study could be explained by the rate of physical inactivity revealed by our study. The correlation between obesity and

HBP is well known in the literature. BP records increase with BMI and obese individuals are at higher risk of hypertension compared with lean populations. The situation in our study was similar. HBP prevalence was 12.2 times higher in obese respondents (35.9%) than in the non-obese group (23.7%).

Hypertension is also quite often associated with diabetes. A correlation was already observed in our series where the nine respondents with diabetes had HBP, i.e. 100% prevalence. Steyn et al. observed this correlation in their study on the risk factors associated with myocardial infarction in Africa.

Conclusion

HBP, a multi-factor based condition records significant frequency in CHUD/B-A workers. There is need for better prevention of the risk factors to contribute to mitigating cardiovascular diseases morbidity and mortality.

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