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Original articles

Knowledge of care providers on the management of high blood pressure in the Boma health zone, Democratic Republic of Congo, 2024

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Background

High blood pressure, also known as hypertension, is a major public health issue globally, affecting approximately 1.13 billion people worldwide. It is a leading risk factor for cardiovascular diseases, which are responsible for a significant number of deaths annually. In the Democratic Republic of the Congo (DRC), the prevalence of hypertension is alarmingly high, with various studies indicating that a substantial portion of the adult population is affected. Effective management of hypertension requires comprehensive knowledge of the disease among healthcare providers. This study explores the knowledge of providers on the management of high blood pressure in the Boma Health Zone in 2024.

Methods

A descriptive study was conducted among 443 healthcare providers (nurses) in first-level health centers in the Boma Health Zone. A non-probability sampling method was used due to practical constraints and the need to obtain specific expertise from a known population of healthcare providers. Data collection was carried out using a questionnaire designed on SurveyCTO, which was installed on the Android phones of each investigator. This method ensured systematic and consistent data recording. Descriptive analyses were performed based on the nature and distribution of the variables to summarize the findings effectively.

Results

This study showed that the majority of providers do not know the risk factors, as well as the causes and symptoms of high blood pressure. Around three-quarters of providers know the blood pressure threshold. None of the providers are aware of the means of diagnosis. Almost all providers do not know the complications, the means of management, and the appropriate diet for managing high blood pressure. Overall, providers exhibited poor knowledge of high blood pressure.

Conclusions

Providers exhibited significant gaps in their knowledge about hypertension, a crucial health issue that requires proficient management to prevent severe complications. Strengthening the capacity of healthcare providers is not only imperative but also urgent. This involves continuous medical education, updated clinical guidelines, and accessible training programs.

INTRODUCTION

High blood pressure (hypertension) currently constitutes a significant public health problem throughout the world and a risk factor for cardiovascular diseases. It currently affects 1.28 billion people aged 30 to 79 worldwide and two-thirds of them live in low- and middle-income countries.[1] It is defined by a systolic blood pressure greater than or equal to 140 mm Hg and/or a diastolic blood pressure equal to or greater than 90 mm Hg.[2]

According to the WHO, less than a third of hypertensive patients in the African region are under treatment, and

only 12% of them manage to control this deadly disease. Globally, about 21% of adults over the age of 30 manage to control their High blood pressure and 42% take medication for the condition. High blood pressure is a major risk factor for strokes and heart attacks.[3]

In Africa, the fight against hypertension is hampered by several factors, including low awareness of the disease, limited access to health services, overburdened health systems, challenges related to medical staff who often have little knowledge of the disease, a lack of access to affordable medicines, and non-compliance with medication regimens. Additionally, increasing obesity rates, unhealthy lifestyles, and insufficient patient education contribute to worsening this situation.[3]

Unfortunately, many providers have poor knowledge of High blood pressure due to their limited professional experience , the lack of continuing training and the lack of screening algorithms and treatment guidelines. Their attitudes and practices do not respect international recommendations.[4]

In the Democratic Republic of Congo (DRC), several studies on High blood pressure have been carried out in a piecemeal manner, but none nationally. The prevalence of High blood pressure in Kongo Central varied from 9.8% in 2007[5] and to 20.4% in 2019.[6] There is a paucity of data on the knowledge of healthcare providers. In 2018 Lulebo in Kinshasa found that out of 102 nurses, 9.5% had had training on cardiovascular diseases, only almost a quarter knew the threshold values of the disease and only 14.7% the therapeutic objectives of uncomplicated hypertension.[7]

On the other hand, it should be noted that our country has a problem of human resources which are limited. At the national level, health professionals number 67% and there is an increase in unqualified personnel in several health facilities following the plethora of medical training institutions.[4]

The province of Kongo Central is not spared from this situation. Hypertensive patients are cared for by nurses and general practitioners. There are no internists in the province.[8] No study in the province has explored healthcare providers' knowledge of High blood pressure management at the first level of care. Thus, this study wanted to fill this gap, in the Boma Health Zone.

METHODOLOGY

TYPE OF STUDY

This is a descriptive study conducted among healthcare providers in first-level health centers that treat High blood pressure in the Boma health zone (ZS).

STUDY FRAMEWORK

The health zone has 11 Health Areas. The study was conducted in all 93 primary level health care establishments (health centers (HCs)) in the ZS from March 5 to May 5, 2024.

STUDY POPULATION

All first-level structures of the ZS and healthcare providers (regular nurses, consultation and maternity nurses) involved in the management of hypertensive patients and having their informed consent were included in the study. Those who were absent during the study period were excluded.

SAMPLING

STATISTICAL UNIT

Our statistical unit was a first-level health center and healthcare provider.

SAMPLE SIZE

The sample size for health centers was 93. For providers it was calculated with the formula $n \geqslant Z_{\alpha}^{2}PQ/d^{2}$ where p (proportion of knowledge), not being known, was considered at 50% and d= 0 .05 . So n was ⩾ 384 , and adding the supposed 10% of refusals and non-responses, this becomes n ⩾ 422, which we rounded to 465, due to 5 per structure (93 structures).

SAMPLING TECHNIQUE

We used non-probability sampling. The Boma ZS was identified by reasoned choice. Exhaustively all 11 health areas and their 93 health centers, primary level were selected . In each structure, five care providers were chosen: the head nurse or his assistant, two consultation nurses (drawn at random and present on the day of the survey) and two maternity nurses (drawn at random and present on the day of the survey). of the investigation).

DATA COLLECTIONS

The individual (interpersonal) interview using a standardized collection form was used. This questionnaire was put into the SurveyCTO software and installed on the Android phone. Obtaining authorizations from the political-administrative authorities, 10 investigators who were recruited and trained for two days on the objectives of the study, the survey questionnaire, its completion, the rules of ethics and the methodology of the 'study. Then a pretest was carried out in the Boma Bungu health zone , outside the study areas. After correcting the collection tool, the investigators were deployed to the field for the collection due April 15 to 25, 2024.

Knowledge of HTA has been evaluated according to whether the service provider defined the following items (table I)

DATA PROCESSING AND ANALYSIS

Data processing consisted of checking the quality of the data collected each day in the evening with the supervisors. The data were exported from the SurveyCTO server in an Excel file format. They were then imported into IBM SPSS

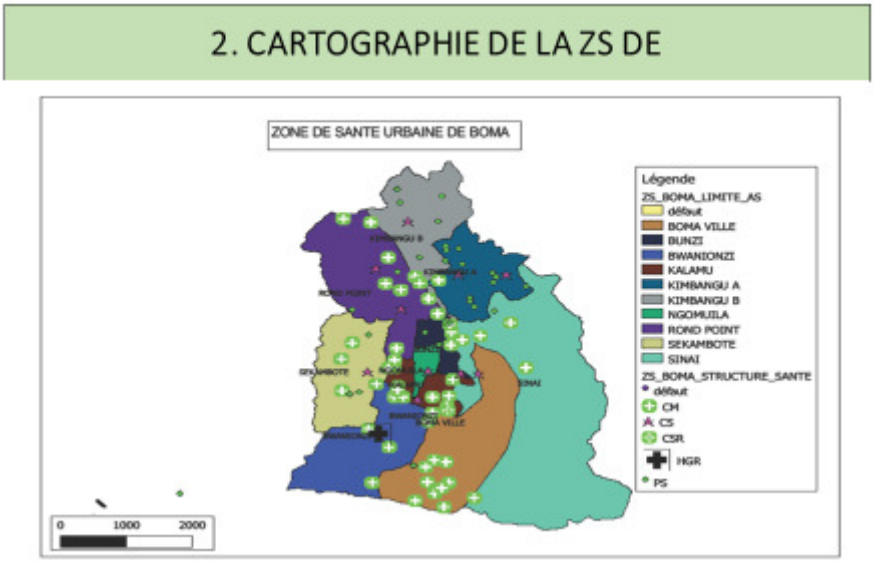

Figure 1. The map of the Boma ZS (source: Central Office of the Boma Health Zone, PAO 2024)

Statistics (version 26) for cleaning and analysis. Descriptive statistics were used to define the sociodemographic characteristics. The data were summarized in tables and graphs. Qualitative variables were expressed in terms of absolute or relative frequencies. Quantitative variables were summarized using the mean and standard deviation or median and interquartile range, depending on whether the distribution was normal or not.

Regarding the providers' knowledge domain, we generated composite variables with ranges as follows: 0 to 10 for knowledge of causes; 0 to 9 for knowledge of cardiovascular risk factors; 0 to 6 for knowledge of symptoms; 0 to 3 for knowledge of diagnostic methods; 0 to 7 for knowledge of complications; 0 to 6 for knowledge of treatment; and 0 to 4 for knowledge of diet.

To do this, we first scored each component as 1 (know) or 0 (do not know), with "Do not know" and "Uncertain" responses considered as do not know. We then obtained the sum of the scored components.

A threshold was set for each composite variable: 7 for knowledge of causes and risk factors, 5 for knowledge of symptoms, complications, and treatment, and 3 for knowledge of diagnostic methods and diet. The code 1 (Know) was noted for observations above the set threshold and 0 (Do not know) for those below.

A final composite variable (overall provider knowledge of hypertension) was generated based on previous binary variables. Inferential statistics were not conducted. listed in Table 1.

ETHICAL CONSIDERATIONS

The study obtained approval from the Ethics Committee of the School of Public Health (number ESP/CE/068/2024). The study took into account respect for the person, the data collected on the participants was anonymous and confidential. Consent from the participants was requested verbally then written and each provider gave their consent by signing the informed consent form. All participants were informed about the aim and conduct of the study.

RESULTS

Out of 465 planned providers, 443 were available, or 99.1%. The 22 (0.9%) non-responding providers were the absentees and refusals. The characteristics of the providers are presented in Table II.

1. SOCIO-DEMOGRAPHIC CHARACTERISTICS OF PROVIDERS

Sociodemographic characteristics of providers will be presented in Table II.

A third of the providers were men. The median age of providers was 40 years with an interquartile range (IQR) of 17 years. The age limits were 20 and 72 years.

Regarding training on the management of hypertension, the majority of training took place recently, with 44 providers (9.9%) trained between 2022 and April 2024. Previous training periods are less represented , with very low percentages for the years 2006-2009, 2010-2013, and 2014-2017.

Finally, the functions of providers in health care establishments (ESS) show that the majority (64.6%) are attending nurses in consultation, and 15.3% were attending nurses in the maternity ward.

3. KNOWLEDGE OF HEALTHCARE PROVIDERS ABOUT HYPERTENSION

Providers' knowledge of the clinic and management of high blood pressure is presented in Table III.

The results in relation to clinical knowledge show that 76.5% of providers have knowledge of the blood pressure threshold being equal to or greater than 140/90 mm Hg, as for the symptoms, the means of diagnosis, the complica-

Table I. list of variables

Variables	Definitions	Scores
Definition of hypertension	SBP≥140mm Hg and DBP≥90 mm Hg	1. Yes 2. No
The causes of hypertension	1.Diabetes mellitus 2.Obesity 3. Hypercholesterolemia 4. Smoking 5. Physical inactivity 6. Alcohol intake 7. Consumption of Foods high in fat 8. Consumption of a lot of salt 9. Family history Events 10. Stress 11. Others to be specified	1. Know if ≥ 7 2. Don't know if ≤ 7
Cardiovascular risk factors	1. Sex 2. Age 3. family ATCD of Early events 4. Tobacco 5. Physical inactivity 6. HT 7. Obesity 8. Diabetes 9. Hypercholesterolemia 10. Others to be specified	1. Know if ≥ 7 2. Don't know if ≤ 7
Symptoms	1. Headaches 2. dizziness 3. Heart Palpitations 4. Blurred vision 5. Dyspnea 6. Tachycardia 7. others to be specified	1. Knowledge ≥ 5 2. Don't know ≤ 5
Diagnostic means	1. Clinical Signs 2. Taking BP 3. Lab Exams 4.Others	1. Know if ≥ 3 2. Don't know if ≤ 3
Complications of High blood pressure	1. Aortic Aneurysm 2. Stroke 3. Hypertensive encephalopathy 4. Hypertensive retinopathy 5. Hypertensive heart disease 6. Ischemic heart disease 7. Hypertensive nephropathy 8. Others	1.Knowledge ≥ 5 2. Don't know ≤ 5
The treatment	1. Calcium channel blockers 2. Anti-Aldosterone 3. Beta blockers 4. Thiazide diuretics 5. Angiotensin 2 Antagonist 6. Conversion Enzyme Inhibitors 7.Others	1. Knowledge ≥ 5 2. Don't know ≤ 5
The diet	1. Physical exercise 2. Salt-free diet 3. Low sodium diet 4. Fruits and vegetables 5. Others to be specified	1. Know if ≥ 3 2. Don't know if ≤ 3
Overall knowledge of High blood pressure	The provider had good or poor knowledge of high blood pressure, if for all items	1. Good knowledge if score of 1 ≥ 5 out of 8 2. Poor knowledge if score of 1<5 out of 8

tions, the means of management, the diet, the causes, the risk factors for a hypertensive patient, they do not know not.

The evaluation of providers according to their overall knowledge of high blood pressure will be presented in the table below.

The results of this table show that overall all providers have poor knowledge of high blood pressure in our Boma Health Zone.

DISCUSSION

OBJECTIVE AND FINDINGS OF THE STUDY

The primary goal of this study was to determine the knowledge level of healthcare providers in the Boma health zone regarding high blood pressure. The findings revealed that approximately 75% of providers were aware of the blood pressure threshold. However, a significant portion of providers lacked knowledge about the risk factors, causes, symptoms, complications, diet, and management options for high blood pressure. Notably, all healthcare professionals were found to be unqualified to diagnose hypertension, indicating a critical gap in their clinical knowledge.

SOCIODEMOGRAPHIC CHARACTERISTICS

The median age of the providers in this study was 40 years, with an interquartile range (IQR) of 17 years, indicating a diverse age range among the participants. Notably, more than half (68.2%) of the providers were female. The maximum age recorded was 72 years, which is comparable to findings from the Lulebo study, where 52.9% of female providers had an average age of 41.1 years ± 10.[7]

In terms of roles, the majority of the providers (64.6%) were attending nurses in consultation roles, with 15.3% working in maternity. This distribution highlights the diverse but complementary roles healthcare providers play in delivering care, with a significant focus on consultations.

Educationally, over half of the providers (59.1%) held nursing degrees. When it comes to seniority, nearly half (47.2%) had less than 10 years of experience, while only 7.2% had 30 years or more. This blend of young professionals and seasoned providers ensures a balance between innovative approaches and valuable experience.

These findings underline the critical role of both experienced and emerging healthcare professionals in enhancing patient care and outcomes in the Boma health zone. By leveraging the strengths of both groups, healthcare systems can achieve a dynamic and effective service delivery mode

PROVIDERS' KNOWLEDGE OF HYPERTENSION

In a study by Lulebo on obstacles to effective blood pressure control in primary health structures in Kinshasa, inadequate knowledge of the blood pressure threshold was identified as a major factor contributing to misdiagnosis and underdiagnosis of hypertension. According to the World Health Organization (WHO), 77.5% of medical professionals were unaware of the hypertension threshold, with many citing values above the recommended threshold. Their lack of management procedures and benefits from on-the-job training may account for their inadequate level of knowledge.[7]

In our study, 76.5% of providers knew the blood pressure threshold. In Benin, a study involving 41 general practi-

Table II. Distribution of providers according to their socio-demographic characteristics

Variables	n=443	% (100)
Sex		
Male	141	31.8
Female	302	68.2
Median age in years (EIQ)	40 (17)	
Age (years)		
20 - 29	66	14.9
30 - 39	131	29.6
40 - 49	146	33
50 - 59	76	17.2
60 and over	24	5.4
Marital status		
Bachelor	170	38.4
Bride)	241	54.4
Divorced	15	3.4
Widower (ve)	17	3.8
Level of education of the provider		
Licensed nurse	9	2
Level A1 nurse (graduate nurses)	252	59.1
A2 level nurse (end of secondary level nurses)	152	34.3
A3 level nurse (nursing assistants)	15	3.4
Midwife	2	0.5
Licensed	3	0.7
Seniority of service providers		
< 1	2	0.2
1 - 5	97	21.9
5 – 10	95	21.4
10 - 20	146	33.0
20 - 30	70	15.8
30 and over	34	7.7
Year of training of the provider on the management of hypertension		
2006 -2009	3	0.7
2010 - 2013	5	1.1
2014 - 2017	5	1.1
2018 - 2021	18	4.1
2022 - April 2024	44	9,9
Function of the provider in the ESS		
Registered Nurse or his deputy	89	20.1
Consultation nurse	286	64.6
Maternity nurse	68	15.3

tioners from eight health establishments revealed that almost half (48.8%) did not know the exact definition of hypertension. In Burkina Faso, in 2002, 65% of doctors based the definition of hypertension primarily on systolic blood pressure. This poor knowledge about complications, treatment methods, and risk factors leads to a lack of understanding of the severity criteria. In Benin, 92.7% of providers were unaware of hypertension risk factors, similar to the situation in Boma.

This lack of knowledge exposes patients to suboptimal care, resulting in poor blood pressure control and an increased risk of cardiovascular events. The WHO suggests less expensive tactics, including task delegation. Task delegation involves assigning responsibilities typically performed by a doctor to a health professional with less formal medical training but specialized training for specific tasks.[9]

In the DRC, task delegation is part of the health policy, which is based on Primary Health Care (PHC). Health Centers (CS) are managed by nurses and represent the first level

of care, acting as the initial contact between patients and the health system. Screening and treatment of non-communicable diseases, such as hypertension, are included in the activities of Health Centers.[10] Treatment must comply with directives from the Ministry of Public Health Hygiene and Prevention.[11] However, our study shows that the providers responsible for managing hypertensive patients have inadequate knowledge of the pathology.

IMPLICATIONS AND RECOMMENDATIONS

The study's results demonstrate an underdiagnosis of hypertension due to poor knowledge, highlighting the need for interventions to improve the management of hypertensive patients. Strengthening the capacity of providers in managing hypertension, as recommended by the FIHA,[12] could reduce misdiagnosis and the associated complications.

This situation calls for immediate action. It is essential to further educate and train providers on hypertension, focusing on early diagnosis and management. Training should be integrated at all educational levels (secondary, university, post-university) and include continuous on-the-job training. Prioritizing non-communicable diseases, particularly hypertension, in the training curricula of providers is crucial. Political and administrative authorities and the Order of Nurses should support this training and ensure an equitable distribution of human resources to provide quality health services in Kongo Central, DRC.

STRENGTHS AND WEAKNESSES OF THE STUDY

This pioneering study in Kongo Central comprehensively assessed all first-level healthcare establishments and unveiled significant deficiencies in the skills of providers, particularly their understanding of hypertension. The findings underscore the need for strategic actions by decision-makers to enhance the capacity-building of healthcare providers in this critical area.

The primary objective of this study is to provide a roadmap for improving the skills and knowledge of healthcare providers regarding hypertension management. However, it's crucial to acknowledge the study's limitations, as it focused exclusively on nurses and their knowledge base.

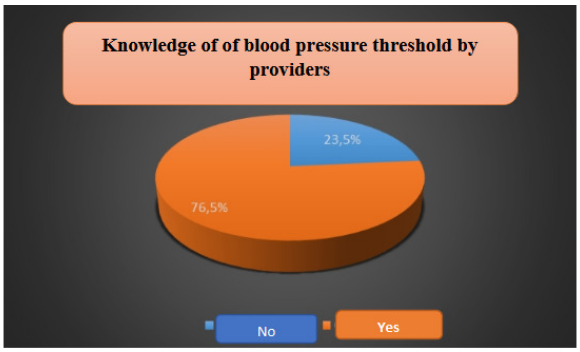

Figure 2. Knowledge of of blood pressure threshold by providers

Effective healthcare service delivery requires a broader approach that includes not only knowledge but also adequate material and financial resources.

To truly address these gaps, a comprehensive inventory that assesses the full spectrum of needs—knowledge, material, and financial—is essential. This holistic approach will ensure that healthcare providers are fully equipped to offer the best possible care to patients with hypertension.

Implementing such measures will not only enhance patient outcomes but also fortify the overall healthcare infrastructure, making it more resilient and capable of addressing hypertension and other health challenges effectively

CONCLUSION

The study uncovered an alarming deficiency in the knowledge of hypertension among providers in first-level structures within the Boma health zone. This highlights the critical need to enhance the diagnosis and management of hypertension in the area.

Addressing these knowledge gaps is vital for improving patient outcomes and reducing the risk of complications associated with hypertension. Therefore, implementing comprehensive training programs and continuous education for healthcare providers is essential to ensure effective management and care for hypertensive patients.

By providing these essential training and education programs, we can empower healthcare providers with the necessary skills and knowledge to effectively manage hypertension. This proactive approach will ultimately lead to better patient outcomes and a reduction in hypertension-related complications

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AUTHORSHIP CONTRIBUTIONS

The study design was carried out by Romain Mvemba, Bernard-Kennedy Nkongolo, Steve Botomba and Muel Telo Marie-claire Muyer.

Data collection was carried out by Romain Mvemba.

The article was written by Romain Mvemba, Bernard-Kennedy Nkongolo and Steve Botomba and Muel Telo Marie-claire Muyer.

The article was revised by Romain Mvemba, Bernard-Kennedy Nkongolo, Steve Botomba and Muel Telo Marie-claire Muyer.

Table III. Distribution of providers according to their knowledge of the clinic and management of high blood pressure

Knowledge of providers about the clinic and PEC of **high blood pressure**	n=443	**Percentage**
Knowledge of blood pressure threshold		
Don't know the BP threshold	104	23.5
Know the BP threshold	339	76.5
Knowledge about symptoms		
Don't know the symptoms of high blood pressure	392	88.5
Know the symptoms of hypertension	51	11.5
Knowledge of diagnostic methods		
Don't know how to diagnose	443	100
Know the means of diagnosis	0	0
Knowledge about complications		
Don't know the complications	438	98.9
Know the complications	5	1.1
Knowledge of means of support		
Don't know the means of support	433	97.7
Know the means of support	10	2.3
Knowledge about diet		
Don't know the diet	439	99.1
Know the diet	4	0.9
Knowledge about the causes		
Don't know the causes	392	88.5
Know the causes	51	11.5
Knowledge of risk factors		
Don't know the risk factors	401	90.5
Know the risk factors	42	9.5

Table IV. Distribution of providers according to their overall knowledge of high blood pressure

Overall knowledge of providers on hypertension	**Number=443**	**%**
Good knowledge (score of 1 ≥ 5 out of 8)	00	0.0
Bad knowledge (score of 1 < 5 out of 8)	443	100.0

DISCLOSURE OF INTEREST

The authors completed the ICMJE Disclosure of Interest Form (available upon request from the corresponding author) and disclose no relevant interests.

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