RESEARCH ARTICLE

Prevalence and associated factors of uncontrolled hypertension in hypertensive patients in the city of Goma, DRC

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Abstract: Background: The objectives of this study were to determine the proportion of uncontrolled hypertension in hypertensive patients followed up on an outpatient basis and to investigate the factors associated with this poor control. Methods: This was a cross-sectional analytical study of 167 hypertensive patients followed in eight health facilities in Goma city. Uncontrolled hypertension was defined as systolic blood pressure (SBP) $\geq$ 140 mmHg and/or diastolic blood pressure (DBP) $\geq$ 90 mmHg. Results: The proportion of uncontrolled hypertension was 95.2%. In bivariate analysis, no factor was associated with uncontrolled hypertension. Conclusion: Almost all hypertensive patients in our study were poorly controlled by antihypertensive treatment. These results highlight the need for a cohort study to determine the factors associated with this excessively high prevalence of uncontrolled hypertension in hypertensive patients on antihypertensive drugs, in order to allow targeted actions to try to control hypertension by antihypertensive drugs.

Keywords: control of hypertension, prevalence, associated factors, Goma

1 Introduction

Hypertension is a major public health problem in both developed and developing countries [1–3]. It affects nearly one and a half billion people worldwide and its prevalence is estimated at 38.5% in men and 33.3% in women aged 25 years and over in the Democratic Republic of the Congo (DRC) [4]. It contributes to the development of cardiovascular complications in the medium and long term and is currently the modifiable risk factor with the most serious health consequences, ahead of tobacco and alcohol [5].

Several studies indicate that patients' interaction with primary care health facilities has a positive effect on lifestyle habits that can lower blood pressure (BP) in hypertensive patients such as a healthy diet, regular physical activity, moderate alcohol consumption, and a reduction of the sodium consumption [5–11]. In addition, early treatment of hypertension reduces the risk of cardiovascular disease [12] and decreases mortality by controlling high BP [11].

Several studies have demonstrated the efficacy of drug treatment of hypertension in preventing stroke and ischaemic heart disease [13–16].

Increasing the proportion of patients with controlled hypertension appears to be one of the most effective measures to reduce the risk of cardiovascular morbidity and mortality. To promote this objective, regularly updated recommendations on the management of hypertension are disseminated by learned societies. The recommendations issued in recent years suggest blood pressure levels below 140/90 mmHg [6–9].

Uncontrolled hypertension is responsible for many cases of stroke, ischaemic coronary heart disease, and renal failure [17].

Different factors are associated with uncontrolled hypertension [18, 19]: (i) Patient-related factors such as therapeutic non-compliance, lack of awareness of hypertension and its consequences, lifestyle factors (alcoholism, sedentary lifestyle), demographic factors (socio-economic status, education level, age, gender); (ii) Health professional factors such as poor knowledge of recommendations, failure to intensify treatment if the therapeutic target is not reached, failure to emphasize lifestyle change; (iii) Health system factors such as limited access to care and treatment.

Patient and health professional factors are the most important factors for sub-optimal control of hypertension [18]. Poor adherence to medication is the main cause [20–22].

Despite the availability of effective antihypertensive drugs and the dissemination of recommendations on the management of hypertension, the control of hypertension in treated hypertensives remains inadequate [7, 19, 23–28, 30]. The prevalence of controlled hypertension varies from 27 to 66% in developed countries [24–28] and rarely reaches 30% in developing countries (23),(27),(29)(30)(7). In sub-Saharan Africa, this prevalence is 3% in Kenya (29), 5% in Mozambique (30), 17% in Namibia (29), and 39% in South Africa (7).

In DRC, the prevalence is 14% (23). Munyapara, studying the control of hypertension in military primary care health facilities in the DRC, found a prevalence of 14.2% of controlled hypertension and 85.8% of uncontrolled hypertension (31). Atoba et al, in Kisangani, found a prevalence of 42.4% (32).

In the city of Goma, there are no data on uncontrolled hypertension and its associated factors among treated hypertensive patients.

The objective of this study is to determine the pre-intervention hospital prevalence of uncontrolled hypertension and to identify its associated factors in patients followed in the health facilities of the city of Goma in the DRC.

2 Methods

2.1 Study setting

This study was carried out in 8 health facilities in the two health zones of Goma city, namely North Kivu Provincial Hospital, Charité maternelle General Reference Hospital, Kyeshero Hospital, Military Hospital, Virunga General Reference Hospital, Moungano Hospital, Notre Dame Hospital, and Heal Africa Hospital. Goma is the capital of the province of North Kivu in the east of the Democratic Republic of the Congo and has an estimated population of 2.1 million in 2021.

2.2 Study design and population

This is a prospective cross-sectional study conducted from November 7 to 20, 2022. We included consecutively all hypertensives followed up at least one month before the survey period and who were taking their treatments regularly. A total of 167 known and followed hypertensives were recruited in the eight health facilities in Goma city.

Our sampling was non-probability for convenience. We included hypertensive patients on antihypertensive treatment, followed for at least one month in one of the above medical facilities, aged at least 18 years, and consented to participate in the study. Pregnant women and patients with secondary hypertension were excluded from the study.

2.3 Data collection

A face-to-face interview was conducted at the sampling site using the pre-tested semi-structured questionnaire. A group of well-trained male and female data collectors (doctors and nurses) interviewed the participants, measuring their physical parameters. The data for this study were collected according to the locally adapted questionnaire and supplemented with questions related to the collection of information on knowledge of hypertension. This allowed us to obtain information on socio-demographic characteristics, hereditary and environmental factors, and data related to the follow-up of hypertensive patients. The same questionnaire also allowed us to collect information on knowledge of hypertension, medical history, and medical antecedents. The information was completed, if necessary, by an interview followed by a physical examination. To compensate for a possible lack of knowledge of French, the questionnaire was translated into local languages (Kiswahili and Lingala) and pretested.

The quantity of tobacco consumed was estimated from the number of cigarette sticks smoked per day, and the duration of exposure by the number of years. A tobacco user in this study was defined as any subject who admitted to smoking at least one cigarette (or taking tobacco) every day for at least one year.

The quantity of alcohol consumed was estimated from the number of measures of alcoholic beverages consumed per day. The duration of exposure is estimated by the number of years. An alcoholic drinker is defined as a person who has consumed at least one alcoholic drink (one bottle of beer/wine/palm wine, one glass of distilled alcoholic drink – whisky or liquor) per week for at least one year (33).

Blood pressure was measured with a mercury sphygmomanometer (brand Mastermed®A1, ref 70 104 04.11100.232, KaWe, Germany) with a cuff of appropriate size for the arm circumference. After a physical and mental rest (calm and seated subject) of 5 to 10 minutes, the blood pressure was measured in a seated position three times, with a one-minute interval between the three measurements. For the analysis, we used the mean between the last two measurements (33).

Uncontrolled hypertension was defined as a systolic blood pressure (SBP) greater than or equal

to 140 mmHg and/or diastolic blood pressure (DBP) greater than or equal to 90 mmHg in treated patients previously diagnosed with hypertension.

2.4 Statistical analysis

Analyses were performed using SPSS version 20.0 (IBM, Chicago, USA). Descriptive analyses were performed by calculating proportions and percentages for categorical variables and by calculating means and their standard deviations for numerical variables.

Bivariate analyses were used to compare the percentages for the categorical variables using Pearson's Chi-square test or Fisher's Exact test depending on their validity conditions.

To control for confounding factors, multivariate analysis using the logistic regression method was used. For this purpose, only variables with an association were included in the logistic regression analysis. The significance level was 0.05.

2.5 Ethical considerations

Ethical approval to conduct the study was obtained from the Medical Ethics Committee of the University of Goma. The members of the Ethics Committee had access to the various source documents and data related to the study.

3 Results

The analysis included 167 patients aged between 23 and 86 years. The sex ratio was 0.6 (62.3% female) and the mean age was 56.8 years (standard deviation [SD]: 11.98) with no significant difference by sex (p>0.05). The distribution of the sample by age group was as follows: 3.0% of the respondents are aged 18-35, 65.9% are aged 36-64 and 31.1% are aged 65 and over. The mean SBP was 154.77 mmHg (SD: 13.72) and the mean DBP was 99.02 mmHg (SD: 10.39).

In our survey population, 95.2% of the subjects had uncontrolled hypertension (Table 1), with no significant difference according to age, sex, marital status, educational level, occupational status, healthcare worker, and monthly income (p>0.05) (Table 2).

Table 1   Prevalence of uncontrolled hypertension

Hypertension	N = 167	95% Confidence interval
Controlled	8 (4.8%)	2.2% – 9.5%
Uncontrolled	159 (95.2%)	90.0% – 98.0%

Table 2   Socio-demographic factors associated with uncontrolled hypertension (n = 167)

Variable	Controlled (n = 8)	Uncontrolled (n = 159)	p-value
Age (years)	53.88 (12.93)	56.94 (11.95)	0.5305
Age class			0.3076
18-35 years	1 (20.0%)	4 (80.0%)	
36-64 years	5 (4.5%)	105 (95.5%)	
≥65 years	2 (3.8%)	50 (96.2%)	
Sex			1.0000
Female	5 (4.8%)	99 (95.2%)	
Male	3 (4.8%)	60 (95.2%)	
Marital status			0.2960
Single	0 (0.0%)	5 (100.0%)	
Divorced/separated	0 (0.0%)	3 (100.0%)	
Married	8 (6.9%)	108 (93.1%)	
Widower	0 (0.0%)	43 (100.0%)	
Educational level			0.1318
Illiterate	0 (0.0%)	14 (100.0%)	
Primary	1 (7.7%)	12 (92.3%)	
Secondary	1 (1.4%)	70 (98.6%)	
Higher	6 (8.7%)	63 (91.3%)	
Occupational status			0.7118
Employed	6 (5.7%)	100 (94.3%)	
Unemployed	2 (3.3%)	59 (96.7%)	
Healthcare worker			1.0000
No	7 (4.7%)	142 (95.3%)	
Yes	1 (5.6%)	17 (94.4%)	
Monthly income (US dollar)			0.2248
None	2 (3.8%)	51 (96.2%)	
<150	0 (0.0%)	27 (100.0%)	
150-200	0 (0.0%)	22 (100.0%)	
201-300	3 (11.5%)	23 (88.5%)	
>300	3 (7.7%)	36 (92.3%)	

The frequency of uncontrolled hypertension increased with age until it reached 96.2% in patients aged 65 years and over, with no significant difference according to age. There was also a variation in the frequency of uncontrolled hypertension according to monthly income. The lower the monthly income, the higher the frequency of uncontrolled hypertension (Table 2).

Family history of hypertension, smoking, alcohol intake, table salt consumption, diabetes mellitus, duration of hypertension, complications of hypertension, consultation of a traditional healer, indigenous treatment, and hygienic-dietary measures did not differ between the groups with controlled and uncontrolled hypertension (p>0.05) (Table 3).

It is also observed that there was no significant difference in the regular follow-up of hypertension patients, number of specialist doctors for follow-up, number of general practitioners for follow-up, information received on hypertension, self-measurement of BP, duration of antihypertensive treatment, and adherence to treatment between the controlled and uncontrolled hypertension groups (p>0.05) (Table 4).

Table 3 Family medical history and lifestyle associated with uncontrolled hypertension

Variable	Controlled (n = 8)	Uncontrolled (n = 159)	p-value
Family history of hypertension			1.0000
No	5 (4.6%)	103 (95.4%)	
Yes	3 (5.1%)	56 (94.9%)	
Smoking			1.0000
No	8 (5.0%)	152 (95.0%)	
Yes	0 (0.0%)	7 (100.0%)	
Alcohol intake			1.0000
No	4 (4.9%)	77 (95.1%)	
Yes	4 (4.7%)	82 (95.3%)	
Salt added on table			0.0570
No	2 (2.0%)	100 (98.0%)	
Yes	6 (9.2%)	59 (90.8%)	
Diabetes mellitus			1.0000
Don't know	0 (0.0%)	17 (100.0%)	
No	6 (5.3%)	108 (94.7%)	
Yes	2 (5.6%)	34 (94.4%)	
Duration of hypertension			0.4379
<5	7 (6.1%)	107 (93.9%)	
≥5	1 (1.9%)	52 (98.1%)	
Hypertension complications			0.1065
Absent	8 (6.7%)	111 (93.3%)	
Present	0 (0.0%)	48 (100.0%)	
Tradipractitioner consultation			0.3619
No	8 (6.0%)	125 (94.0%)	
Yes	0 (0.0%)	34 (100.0%)	
Indigenous treatment			0.4391
No	7 (5.9%)	111 (94.1%)	
Yes	1 (2.0%)	48 (98.0%)	
Hygienic-dietary measures			0.7218
No	3 (3.8%)	77 (96.2%)	
Yes	5 (5.7%)	82 (94.3%)	

4   Discussion

The prevalence of uncontrolled hypertension in the current survey was 95.2%. Compared to the prevalences found in previous studies conducted in urban Congolese adults in the DRC, this prevalence was comparable to 86% and 85.8% reported respectively by Katchunga et al. in Bukavu [23] and Munyapara in Kinshasa [31]; much higher by 57.6% found by Atoba et al. in Kisangani (32). Compared to sub-Saharan African authors, the prevalence of uncontrolled hypertension reported in this study was comparable to 97% reported by Hendriks et al. [29] in Kenya and Namibia, Damasceno et al. [30] in Mozambique (95%). The prevalence of uncontrolled hypertension in the present survey was much higher than the prevalence reported in developed countries which varies from 34 to 73% [24–28].

The difference with the series of Atoba et al. [32] was that they included all hypertensives even those who were not on antihypertensive treatment and newly diagnosed hypertensives whose diagnosis was based on a single BP reading at the time of the survey. As a result, this prevalence is underestimated in their series.

The difference with developed countries can be justified in several ways, firstly the poor quality of medicines served in Africa and particularly in the DRC where there is no pharmacovigilance and drug control service. Secondly, poverty in Africa means that patients do not have access to

Table 4   Monitoring and control of hypertension in 167 hypertensive patients in Goma, DRC

Variable	Controlled (n = 8)	Uncontrolled (n = 159)	p-value
Regular follow-up			0.0891
No	1 (2.6%)	38 (97.4%)	
Yes, by a general practitionner	4 (3.7%)	103 (96.3%)	
Yes, by a specialist doctor	3 (14.3%)	18 (85.7%)	
Number of specialist doctors for follow-up			0.3618
None	4 (4.4%)	87 (95.6%)	
One only	3 (4.3%)	67 (95.7%)	
Two or more	1 (16.7%)	5 (83.3%)	
Number of general practitioners for follow-up			0.8119
None	1 (2.7%)	36 (97.3%)	
One only	4 (6.2%)	60 (93.8%)	
Two or more	3 (4.5%)	63 (95.5%)	
Information received about hypertension			0.6008
No	0 (0.0%)	23 (100.0%)	
Yes	8 (5.6%)	136 (94.4%)	
Self-measurement of blood pressure			0.4710
No	4 (3.8%)	101 (96.2%)	
Yes	4 (6.5%)	58 (93.5%)	
Length of time on treatment			0.4225
<6 months	3 (4.1%)	71 (95.9%)	
6-12 months	4 (8.0%)	46 (92.0%)	
>12 months	1 (2.3%)	42 (97.7%)	
Therapeutic adherence			0.8111
Good	2 (5.4%)	35 (94.6%)	
Moderate	2 (3.5%)	55 (96.5%)	
Poor	4 (5.5%)	69 (94.5%)	

quality medicines which are excessively expensive due to lack of financial means and thirdly, the use of indigenous treatment is an obstacle to good adherence to drug treatment.

With regard to the factors associated with uncontrolled hypertension, unlike the other studies, we did not find any factors. This can be justified by the fact that almost all of our patients had uncontrolled hypertension, making the size of the control group very small (<10), making it difficult to detect a significant difference when comparing it with a group of 159 who had uncontrolled hypertension.

This study has some limitations. The proportion of uncontrolled hypertension was based on BP measurement only and this could affect its frequency. Hence the need for a cohort study.

5   Conclusion

The present study shows that 95.2% of hypertensives had uncontrolled hypertension. These results highlight the need for a cohort study to determine the factors associated with this excessively high prevalence of uncontrolled hypertension in hypertensives on antihypertensive drugs, in order to allow targeted actions to try to control hypertension with antihypertensive drugs.

Data availability

The datasheet used to support the findings of this study are available from the corresponding author upon request.

Competing interests

The authors declare that they have no competing interests.

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