Original Research

A Call to Action: Insights into Hypertension Prevalence and Management in an Urban Sub-Saharan African Population

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Abstract

Background: Hypertension is a global health challenge, with a disproportionate burden in low- and middle-income countries like Cameroon. Urban centers, such as Yaoundé, face increasing prevalence driven by rapid urbanization and healthcare disparities. The study objective is to assess hypertension prevalence, associated risk factors, and barriers to effective management in an urban Cameroonian population.

Methodology: A cross-sectional study was conducted in 2024 as part of the HEAVEN-CIEL Hypertension Awareness Campaign. Data from 181 adults were collected through structured questionnaires and physical assessments, including blood pressure measurements. Associations with demographic, socioeconomic, and lifestyle factors were analyzed using chi-square tests and logistic regression.

Results: Hypertension prevalence was 59.67%, with rates peaking at 75.56% among individuals aged 46–60 years ($p = 0.0019$). Medium-income participants showed the highest prevalence at 75.56% ($p = 0.043$). Obesity ($p = 0.0024$) and high-fat diets ($p = 0.0212$) were significant risk factors. Alarmingly, 87.04% of hypertensive individuals were untreated, highlighting gaps in medication access and adherence.

Conclusion: Hypertension in Yaoundé represents a major public health concern, driven by age, socioeconomic disparities, and unhealthy lifestyle factors. The low treatment rates reflect systemic healthcare barriers. Comprehensive, culturally sensitive interventions are urgently needed to improve awareness, prevention, and management. Future research should focus on the longitudinal impacts of targeted public health strategies.

Keywords: Hypertension; Urban Health; Sub-Saharan Africa; Public Health; Healthcare Access; Lifestyle Factors; Cameroon.

Quick Response Code:

Introduction

Hypertension, commonly known as high blood pressure, is a global health issue and a leading risk factor for cardiovascular diseases, kidney failure, and stroke.[1-4] According to the World Health Organization, an estimated 1.28 billion adults aged 30–79 years worldwide suffer from hypertension, with nearly two-thirds residing in low- and middle-income countries.[1-5] Sub-Saharan Africa, including Cameroon, bears a disproportionate burden, driven by rapid urbanization, lifestyle changes, and limited healthcare access.[5,6]

Despite these alarming statistics, efforts to address hypertension in Cameroon remain insufficient. Recent data from Yaoundé, a rapidly growing urban center, reveal a hypertension prevalence of 59.67%, far exceeding global averages. [3,4,7-10] Age, income, and lifestyle factors such as diet and physical activity play a significant role in this public health crisis. Yet, barriers to medication access and adherence persist, leaving a substantial proportion of hypertensives untreated. [1-6]

This study, conducted under the HEAVEN-CIEL Initiative (Hypertension Evaluation and Awareness for Vital Engagement in Neighbourhoods through Community Interventions for Effective Lifestyle Changes), aims to provide a comprehensive analysis of hypertension determinants in Yaoundé. The findings offer actionable insights for targeted public health interventions in urban Cameroon.

Methods

Study Design

This cross-sectional study was conducted between January and December 2024 as part of the HEAVEN-CIEL Hypertension Awareness Campaign, an initiative of the Heaven Foundation-Fondation CIEL. This campaign represents a key component of the foundation's mission to address pressing public health challenges in Cameroon by promoting community-based interventions. Designed to advance early detection, encourage lifestyle modifications, and support effective hypertension management, the campaign emphasized a holistic and participatory approach to tackling hypertension.

The initiative leveraged the Heaven Foundation-Fondation CIEL's established community networks and credibility to engage diverse populations across Yaoundé. It aims to not only identify individuals at risk but also empower communities with the knowledge and resources necessary to reduce the burden of hypertension. Through structured health screenings, educational sessions, and culturally tailored interventions, the campaign sought to foster long-term behavioral changes and improve access to preventive care and treatment options. By aligning with the foundation's broader vision of promoting equitable health outcomes, this campaign set the groundwork for future community-driven public health initiatives in Cameroon.

Participants

Adults aged 18 years and older were recruited from diverse socioeconomic and ethnic backgrounds across multiple neighbourhoods in Yaoundé using a multi-stage stratified sampling approach. The sample was stratified by age group, gender, and income level to ensure broad representation across different demographic segments of the urban population.

Sample Size Calculation

The minimum required sample size was determined using Cochran's formula for cross-sectional studies:

$n = Z^2 P(1-P)/d^2$

where:

- Z = 1.96 (for a 95% confidence interval),
- P= estimated hypertension prevalence from previous studies in Cameroon (~47% based on recent data),
- d = 0.07 (margin of error).

Based on this calculation, the required sample size was 181 participants to ensure adequate statistical power for detecting associations between hypertension and key risk factors.

Sampling Technique

A stratified random sampling method was employed to ensure proportional representation of different socioeconomic groups, age ranges, and genders. Participants were recruited from community centers, healthcare facilities, and public spaces through systematic random selection.

Inclusion and Exclusion Criteria

Inclusion criteria:

- Adults aged 18 years and above.
- Willingness to provide written informed consent.
- Availability for structured interviews and physical assessments.

Exclusion criteria:

- Individuals with secondary hypertension or known chronic kidney disease, as these conditions could confound results.
- Pregnant women, due to the physiological variations in blood pressure.
- Individuals with severe cognitive impairment or communication barriers preventing participation in structured interviews.

Data Collection

Trained volunteers and healthcare professionals collected data using a structured questionnaire and physical assessments:

Demographic Information: Age, gender, ethnicity, income level, education, and employment status.

Lifestyle Factors: Smoking, alcohol consumption, dietary habits, and physical activity levels.

Health Indicators: Height, weight (to calculate BMI), systolic and diastolic blood pressure, and frequency of BP checks.

Blood pressure measurements (three times and on at least two occasions) were taken using automated devices, following the American Heart Association guidelines. Hypertension was defined as systolic BP ≥ 130 mmHg and/or diastolic BP ≥ 80 mmHg. [11-14]

Statistical Analysis

Data was analyzed using SPSS Version 26. Chi-square tests assessed associations between categorical variables, while logistic regression determined predictors of hypertension. A p-value < 0.05 indicated statistical significance.

Ethics Statement

This study was conducted in accordance with the principles outlined in the Declaration of Helsinki and adhered to ethical guidelines for research involving human participants. Ethical approval for the study was obtained from the Heaven Foundation-Fondation CIEL ethics review board prior to data collection.

Participants were informed about the objectives, procedures, and potential risks of the study and provided written informed consent before participation. Participation was entirely voluntary, and participants had the right to withdraw at any time without penalty. Confidentiality of all participant information was strictly maintained, with data anonymized to protect privacy.

The research team ensured that all interactions with participants were conducted respectfully and with cultural sensitivity, in alignment with the community engagement goals of the HEAVEN-CIEL Hypertension Awareness Campaign. No participants were exposed to harm or undue burden during the study.

If any participant was found to have elevated blood pressure levels during the study, they were referred to appropriate healthcare services for further evaluation and management.

Results

Demographic Overview

This cross-sectional study included 181 participants from Yaoundé, Cameroon, representing a diverse demographic and cultural profile. The average age of participants was 43.3 ±16.4 years, reflecting a wide range of age groups. Gender distribution was nearly equal, with 55% males and 45% females, ensuring a balanced representation of both sexes. The participants were drawn from 26 ethnic groups, highlighting the multicultural nature of Yaoundé's urban population. This diversity provided a unique opportunity to assess the influence of ethnicity and cultural practices on hypertension prevalence.

Key Findings

Prevalence of Hypertension: The overall prevalence of hypertension in the study cohort was alarmingly high, with 108 out of 181 participants (59.67%) classified as hypertensive based on the American Heart Association (AHA) 2017 criteria (systolic blood pressure [SBP] ≥ 130 mmHg and/or diastolic blood pressure [DBP] ≥ 80 mmHg) (as illustrated in Figure 1). [7,15-23]
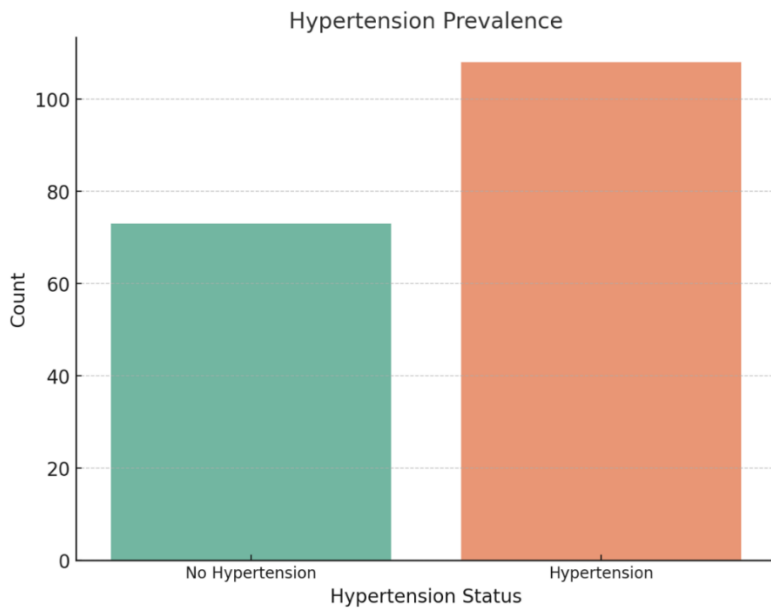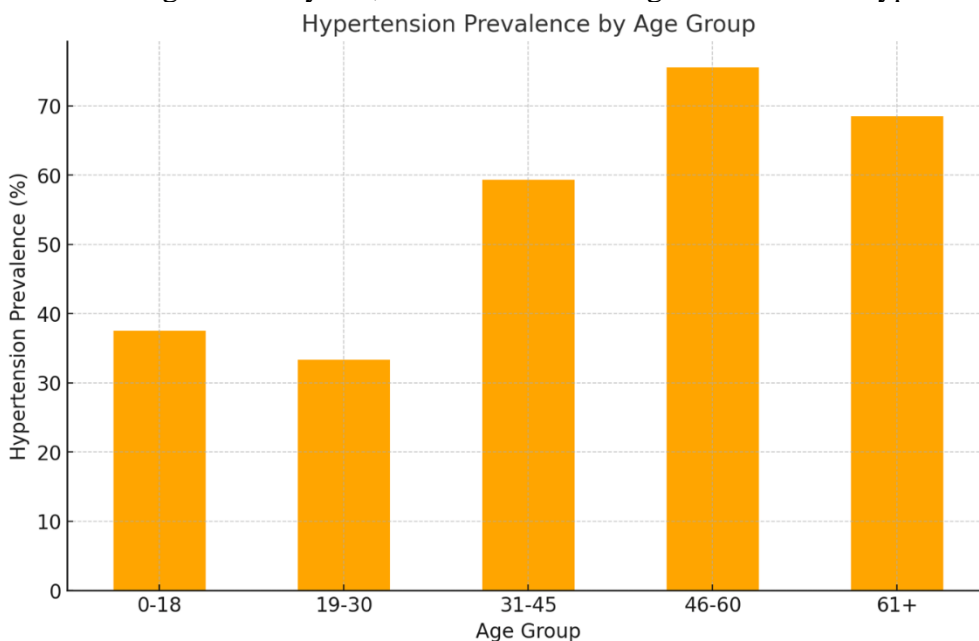
Figure 1: Prevalence of Hypertension in an Urban Cameroonian Population

This figure illustrates the overall prevalence of hypertension (59.67%) among the study participants in Yaoundé, Cameroon, based on the American Heart Association 2017 criteria (SBP ≥ 130 mmHg and/or DBP ≥ 80 mmHg). The high prevalence underscores the critical public health challenge posed by hypertension in this urban setting.

These findings highlight a critical public health concern in this urban population, underscoring the urgent need for targeted interventions.

Age and Hypertension: Hypertension prevalence demonstrated a significant association with age ($p = 0.0019$), increasing markedly in older age groups. The highest prevalence was observed among individuals aged 46–60 years, with 75.56% meeting the criteria for hypertension (Figure 2).


Figure 2: **Age-Stratified Prevalence of Hypertension**

The figure depicts the distribution of hypertension prevalence across different age groups, highlighting a significant increase in prevalence with age. The highest prevalence (75.56%) was observed among individuals aged 46–60 years (p = 0.0019), emphasizing the need for targeted interventions in this age group. Younger age groups, particularly those under 30, had relatively lower prevalence rates.

Income and Hypertension: Income level was significantly associated with hypertension prevalence (p = 0.043) – as illustrated in Figure 3.

This figure explores the relationship between socioeconomic status and hypertension prevalence. Medium-income participants exhibited the highest prevalence (75.56%), while low-income and high-income groups showed prevalences of 54.48% and 50%, respectively (p = 0.043). These findings suggest complex socioeconomic influences on hypertension risk.

Participants in the medium-income group exhibited the highest prevalence at 75.56%, possibly reflecting unique stressors related to work-life balance and access to healthcare services. High-income individuals had a prevalence of 50%, while low-income participants showed a moderate prevalence of 54.48%.
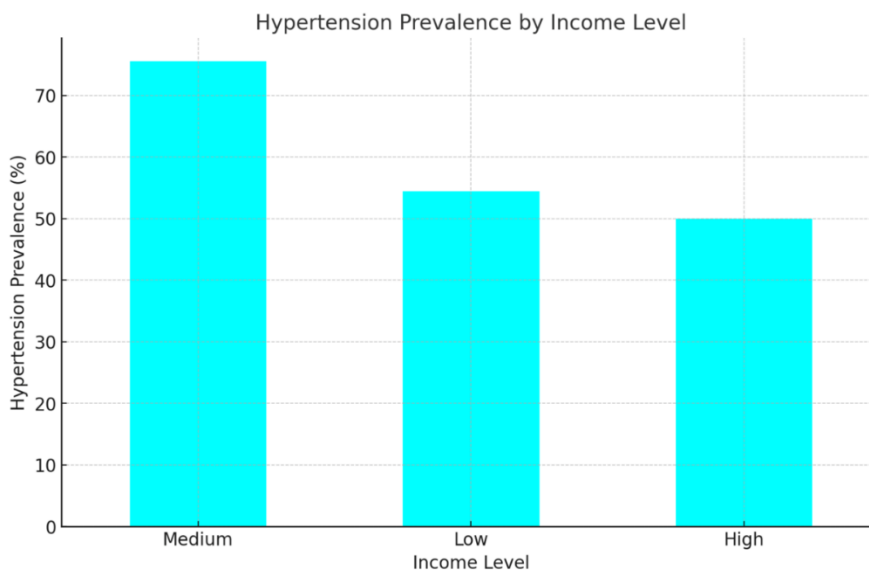
Figure 3: **Association Between Income Level and Hypertension Prevalence**

Medication Usage: A striking finding was the low rate of medication usage among hypertensive individuals (those meeting the criteria of stage 2 hypertension). Among those classified as 2 hypertensives, 87.04% were not receiving treatment (Figure 4).
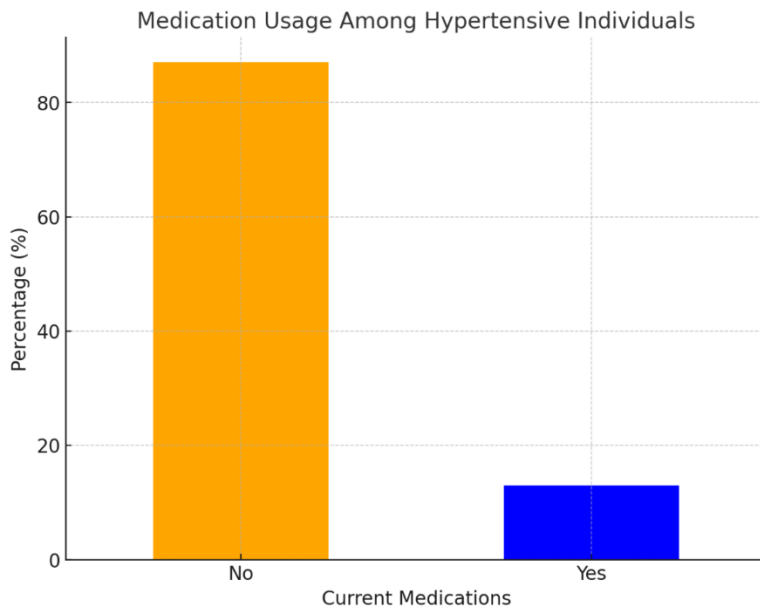
Figure 4: **Medication Usage Among Hypertensive Individuals**

The figure presents the proportion of untreated hypertensive participants among those classified as stage 2 hypertensive. A striking 87.04% of these individuals were not on antihypertensive medication, highlighting significant barriers to healthcare access and adherence.

This gap indicates significant barriers to healthcare access, lack of awareness about the importance of treatment, or cultural beliefs that may influence health-seeking behaviors.[7-9,25-32] Addressing these barriers is critical for improving hypertension control and preventing complications such as cardiovascular and renal diseases.[24]

Lifestyle Factors: Lifestyle factors were strongly associated with hypertension. Obesity emerged as a significant predictor, with hypertensive prevalence increasing with higher body mass index (BMI) categories ($p = 0.0024$). Dietary habits also played a critical role, with high-fat diets significantly increasing the risk of hypertension ($p = 0.0212$).

Ethnicity and Hypertension: Although no statistically significant association was found between ethnicity and hypertension prevalence ($p = 0.831$), notable differences in prevalence patterns were observed among specific ethnic groups.

Discussion

This study highlights the critical public health challenge of hypertension in urban Cameroon, with an alarming prevalence rate exceeding 59.67% of the population. Significant determinants, including age, income, and lifestyle factors, were identified, emphasizing the multifaceted nature of this condition. The minimal use of antihypertensive medications, with 87% of stage 2 hypertensive individuals untreated, underscores systemic barriers in healthcare access and awareness, signaling an urgent need for targeted interventions and policy reforms.

Public Health Implications

Age-Specific Interventions: Hypertension prevalence increases significantly with age, necessitating tailored interventions across different age groups.[7-9,25-32] Younger adults (19–30 years) should be the focus of preventive measures, including educational campaigns that promote physical activity and balanced diets to curb long-term risks. For older adults (46+ years), where prevalence peaks at 75.56%, management strategies should prioritize medication adherence programs, routine blood pressure monitoring, and comprehensive lifestyle modifications. Age-specific approaches can effectively address the distinct challenges and risk profiles of these groups. [24]

Socioeconomic Disparities: The study revealed a significant association between income level and hypertension prevalence, with medium-income individuals exhibiting the highest rates (75.56%). This group may face unique stressors, such as occupational demands, insufficient healthcare follow-up, and financial pressures, which contribute to their vulnerability. Policies aimed at reducing these stressors such as workplace wellness programs, subsidized healthcare services, and affordable treatment options are crucial. Addressing socioeconomic disparities is essential to achieving equitable health outcomes. [7,15-23]

Lifestyle Modifications: Lifestyle factors, particularly obesity and dietary habits, were strongly associated with hypertension. The significant correlation between obesity and hypertension underscores the need for community-based initiatives to promote physical activity and healthy eating. [7-9,25-32] Public health campaigns should prioritize reducing dietary salt and fat intake, which are known contributors to high blood pressure. Programs that engage communities through culturally relevant education and accessible resources, such as exercise facilities and affordable healthy foods, are critical for sustainable impact.

Barriers to Medication Adherence: The minimal use of antihypertensive medications among hypertensive individuals in this study reflects systemic gaps in healthcare access and affordability. Several factors contribute to low adherence rates in the context of Sub-Saharan Africa and, specifically, Cameroon: These factors include economic and healthcare system barriers. Limited health insurance coverage is another important barrier. In Cameroon, health insurance coverage remains low, with a significant portion of the population relying on out-of-pocket payments for medical expenses.

Studies have shown that lack of insurance is a major predictor of poor medication adherence in low- and middle-income countries (LMICs). [33,34] The challenge of the high cost of antihypertensive medications is a major problem in Cameroun Even when medications are available, the cost of long-term therapy is prohibitive for many individuals, particularly those in low- and middle-income brackets. Affordability remains a major obstacle to consistent adherence in Cameroon and other Limits. [3,35] The limited access to healthcare facilities is a another contributor to medication adherence This is exemplified by the uneven distribution of healthcare services, particularly in urban slums and peri-urban areas, thus affecting follow-up visits and medication refills.[36]

Sociocultural and Psychological Factors

Beliefs About Hypertension and Traditional Medicine: In many Sub-Saharan African settings, hypertension is often not perceived as a severe condition unless symptoms are severe. Some patients may rely on herbal or traditional medicine due to cultural beliefs.[[37,38] Low Health Literacy: Limited awareness about the asymptomatic nature of hypertension leads to poor adherence.[39] Patients may discontinue medication once they feel better, leading to poor blood pressure control. Pill Burden and Side Effects: The complexity of antihypertensive regimens, especially when combined with diabetes or other comorbidities, contributes to non-adherence. [40]

Structural and Systemic Factors: also impact on hypertension prevalence, medication adherence and levels of hypertension control among urban population of Cameroon as identified in this study. Some of these factors include inconsistent Medication Supply**.** Disruptions in the supply chain result in frequent stockouts of essential antihypertensive medications in public hospitals and pharmacies. [41] The limited Government Support for Hypertension Control in Cameroon is also a factor. Unlike infectious diseases such as HIV/AIDS, hypertension receives little funding in Cameroon's public health agenda, leading to weak primary healthcare interventions. [4]

Addressing these barriers requires a multifaceted approach, including expanding health insurance coverage, reducing medication costs, enhancing community-based health literacy programs, and strengthening supply chain management for antihypertensive drugs. [7,15-23]

Ethnic and Cultural Considerations: Although no statistically significant differences in hypertension prevalence were observed among ethnic groups, the study's findings emphasize the need for culturally sensitive approaches to hypertension management. Tailored interventions that respect cultural norms and practices can enhance community engagement and program effectiveness. Efforts should focus on inclusivity, ensuring that public health initiatives resonate with the diverse cultural contexts of Yaoundé's population. [7,15-23]

Study Limitations

This study's cross-sectional design limits the ability to infer causality between hypertension and its associated factors. Additionally, the reliance on self-reported data for lifestyle behaviours and medication adherence may introduce recall bias, potentially affecting the accuracy of the findings. The relatively small sample size, while representative of urban Yaoundé, may not fully capture the heterogeneity of the broader population. Despite these limitations, the study provides valuable insights that can guide public health strategies.

Future Research

To build on these findings, longitudinal studies are necessary to assess the long-term effects of targeted interventions and the progression of hypertension in urban Cameroon. Qualitative research exploring barriers to medication adherence and healthcare access will provide a deeper understanding of community-specific challenges. Further investigation into the interplay of cultural practices, socioeconomic factors, and health outcomes can inform the development of more tailored and effective public health strategies.

This study underscores the urgent need for comprehensive, culturally informed public health initiatives to address hypertension in Cameroon. By targeting key determinants and barriers, such efforts can significantly reduce the burden of hypertension and improve health outcomes in this high-risk population.

Conclusion

Hypertension remains a critical and escalating public health challenge in urban Sub-Saharan Africa, as demonstrated by the high prevalence rates in Yaoundé, Cameroon. This study highlights the multifaceted determinants of hypertension, including socioeconomic disparities, age, lifestyle factors, and systemic barriers to healthcare access. The findings underscore the urgent need for targeted interventions tailored to the unique needs of this population.

By addressing barriers to medication adherence, promoting lifestyle modifications, and implementing age- and income-specific strategies, significant strides can be made toward reducing hypertension prevalence. Additionally, culturally sensitive approaches and equitable healthcare policies are essential to overcoming systemic gaps and ensuring sustainable outcomes.

While this study provides a foundation for actionable insights, future research is crucial to deepen our understanding of hypertension dynamics and evaluate the long-term impact of interventions. A coordinated effort involving policymakers, healthcare providers, and community stakeholders will be vital in combating the hypertension crisis and improving cardiovascular health outcomes in Cameroon and beyond.

Funding Statement

Conflict of Interest Statement

The authors declare there are no conflicts of interest related to this study. The research was conducted independently, and there are no financial, personal, or professional relationships that could influence the findings or interpretations presented in this manuscript.

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