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Factors Associated with Poor Blood Pressure Control Among Hypertensive Patients Managed in the Internal Medicine Department of Gwawino General Hospital, Nigeria

Facteurs associés au mauvais contrôle tensionnel chez les patients hypertendus pris en charge au service de Médecine Interne de l'Hôpital Général de Gwawino, Nigeria

Peter Balogun, Matt Adebayo, Amadou Umar

Internal Medicine Department of Gwawino General Hospital, Nigeria

RÉSUMÉ

Introduction. Le mauvais contrôle tensionnel reste fréquent chez les patients hypertendus suivis en Afrique subsaharienne, et contribue directement au risque d'accident vasculaire cérébral, d'insuffisance rénale et d'événements cardiovasculaires. Cette étude visait à identifier les facteurs associés au mauvais contrôle tensionnel chez des patients hypertendus pris en charge au service de Médecine Interne de l'Hôpital Général de Gwawino, au Nigeria. **Méthodes.** Il s'agit d'une étude transversale analytique portant sur de 52 patients hypertendus connus. La variable dépendante était le contrôle tensionnel à l'admission, défini par une pression artérielle inférieure à 140/90 mmHg. Les analyses bivariées ont utilisé le test du Chi carré ou le test exact de Fisher pour les variables catégorielles, et le test t de Welch pour les variables continues. Un modèle de régression logistique multivariée a ensuite estimé les odds ratios ajustés des facteurs retenus. **Résultats.** Le mauvais contrôle tensionnel concernait 27 patients sur 52, soit 51,9 %. En analyse bivariée, l'indice de masse corporelle plus élevé ($p = 0,059$), le tabagisme ($p = 0,155$) et la mauvaise observance thérapeutique ($p = 0,158$) montraient une tendance à l'association avec le mauvais contrôle, sans atteindre le seuil de signification statistique. Le modèle multivarié, ajusté sur l'âge et le sexe, confirmait une tendance similaire pour l'indice de masse corporelle (OR ajusté 1,14, IC95 % 0,99-1,31, $p = 0,066$), le tabagisme (OR ajusté 2,79, IC95 % 0,48-16,25, $p = 0,254$) et la mauvaise observance (OR ajusté 2,24, IC95 % 0,66-7,59, $p = 0,193$), sans significativité statistique formelle compte tenu de la faible taille d'échantillon. **Conclusion.** Aucun facteur n'atteignait un seuil de signification statistique stricte, mais des tendances cohérentes avec la littérature internationale se dégagent pour l'indice de masse corporelle, le tabagisme et l'observance thérapeutique.

Mots-clés : hypertension artérielle, contrôle tensionnel, facteurs associés, Nigeria, Afrique subsaharienne, étude transversale

ABSTRACT

Background. Poor blood pressure control remains common among hypertensive patients followed in sub-Saharan Africa and contributes directly to stroke, chronic kidney disease, and cardiovascular events. This study aimed to identify factors associated with poor blood pressure control among hypertensive patients managed in the Internal



Correspondence : Peter Balogun

Email: balogun5465@gmail.com

Received: 18 May 2026/ Accepted: 23 July 2026 / Published : 15 July 2026

<https://doi.org/bh/s11556-02>



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Medicine Department of Gwawino General Hospital, Nigeria. **Methods.** This analytical cross-sectional study of 52 known hypertensive patients. The dependent variable was blood pressure control at admission, defined as a blood pressure below 140/90 mmHg. Bivariate analyses used the Chi-square test or Fisher's exact test for categorical variables, and Welch's t-test for continuous variables. A multivariable logistic regression model then estimated adjusted odds ratios for the retained factors. **Results.** Poor blood pressure control affected 27 of 52 patients, or 51.9%. In bivariate analysis, higher body mass index ($p = 0.059$), current smoking ($p = 0.155$), and poor treatment adherence ($p = 0.158$) showed a trend toward association with poor control, without reaching statistical significance. The multivariable model, adjusted for age and sex, confirmed a similar trend for body mass index (adjusted OR 1.14, 95% CI 0.99-1.31, $p = 0.066$), smoking (adjusted OR 2.79, 95% CI 0.48-16.25, $p = 0.254$), and poor adherence (adjusted OR 2.24, 95% CI 0.66-7.59, $p = 0.193$), without formal statistical significance given the limited sample size. **Conclusion.** No factor reached strict statistical significance, but trends consistent with the international literature emerged for body mass index, smoking, and treatment adherence.

Keywords : hypertension, blood pressure control, associated factors, Nigeria, sub-Saharan Africa, cross-sectional study

1. Introduction

Hypertension remains the leading modifiable risk factor for cardiovascular disease worldwide, and its burden continues to rise fastest in sub-Saharan Africa, where health systems often struggle to sustain long-term chronic disease follow-up. Regional pooled estimates place hypertension prevalence among African adults at close to 30%, with control rates among treated patients frequently reported below 30% in hospital-based studies across West and Central Africa. Poor blood pressure control translates directly into a higher incidence of stroke, hypertensive heart disease, and chronic kidney disease, conditions that already weigh heavily on secondary and tertiary care facilities in the region.

Several factors have been repeatedly linked to poor blood pressure control in African cohorts, including advanced age, obesity, tobacco use, poor treatment adherence, and the presence of comorbid conditions such as diabetes or chronic kidney disease. Socioeconomic and behavioral determinants, including education level, place of residence, and physical activity, have also been explored, with mixed results depending on the setting studied. Identifying which factors carry the strongest association in a given clinical population remains essential to guide targeted interventions, particularly in resource-limited internal medicine departments where systematic hypertension registries are rare.

This study was designed a classical factors-associated cross-sectional study in clinical epidemiology. Using dataset of 52 hypertensive patients attributed to the Internal Medicine Department of Gwawino General.

Hospital, Nigeria, the objective was to identify sociodemographic, behavioral, and clinical factors associated with poor blood pressure control at admission.

2. Methods

2.1 Study design and setting

This was an analytical cross-sectional study. The study setting, the Internal Medicine Department of Gwawino General Hospital in Taraba State, Nigeria.

2.2 Data source

The dataset used for 52 known hypertensive patients, hospitalized or followed in outpatient internal medicine consultation, with sociodemographic, behavioral, and clinical variables recorded at a single time point.

2.3 Variables

The dependent variable was blood pressure control at admission, dichotomized as controlled (systolic blood pressure below 140 mmHg and diastolic blood pressure below 90 mmHg) or uncontrolled. Independent variables covered three domains. Sociodemographic variables included age, sex, marital status, education level, occupation, and area of residence. Behavioral variables included smoking status, alcohol use, physical activity, and treatment adherence. Clinical variables included body mass index, duration of known hypertension, associated diabetes, and chronic kidney disease. Systolic and diastolic blood pressure at admission were used solely to define the outcome and were excluded from the explanatory models, since including them as predictors would have been tautological.

2.4 Statistical analysis

Descriptive statistics were reported as mean with standard deviation for continuous variables and as frequency with percentage for categorical variables. Bivariate comparisons between patients with controlled and uncontrolled blood pressure used the Chi-square test, or Fisher's exact test when expected cell counts were below 5, for categorical variables, and Welch's t-test for continuous variables, with the Mann-Whitney U test used as a sensitivity check given the small sample size. Variables associated with the outcome at a bivariate threshold of $p < 0.20$, together with age and sex as core adjustment covariates, were entered into a multivariable logistic regression model. Adjusted odds ratios with 95% confidence intervals were reported. A p-value below 0.05 was considered statistically significant. Analyses were performed using Python 3 (pandas, scipy, statsmodels).

3. Results

3.1 General characteristics

Among the 52 patients included, the mean age was 57.1 years, and blood pressure was uncontrolled in 27 patients (51.9%) at admission. Table 1 presents the sociodemographic, behavioral, and clinical characteristics of the study population according to blood pressure control status.

3.2 Bivariate analysis

No variable reached the conventional threshold of statistical significance ($p < 0.05$) in bivariate analysis, which is consistent with the limited statistical power of a 52-patient sample. Three variables nonetheless showed a trend toward association with poor blood pressure control and were retained for multivariable adjustment together with age and sex: body mass index ($p = 0.059$), current smoking ($p = 0.155$), and poor treatment adherence ($p = 0.158$). As expected by construction of the outcome variable, systolic and diastolic blood pressure at admission differed markedly between groups (both $p < 0.001$) but were excluded from explanatory modeling for the methodological reasons stated above.

3.3 Multivariable analysis

Table 2 presents the results of the multivariable logistic regression model. After adjustment for age and sex, higher body mass index remained associated with poor blood pressure control at a borderline level (adjusted OR 1.14 per additional kg/m^2 , 95% CI 0.99-1.31, $p = 0.066$). Current smoking was associated with a nearly three-fold increase in the odds of poor control, although the confidence interval was wide and crossed unity (adjusted OR 2.79, 95% CI 0.48-16.25, $p = 0.254$). Poor treatment adherence more than doubled the odds of poor control, again without reaching formal significance (adjusted OR 2.24, 95% CI 0.66-7.59, $p = 0.193$). Age and sex were not

independently associated with the outcome in the adjusted model.

Table 1. Characteristics of patients according to blood pressure control status (n = 52)

Characteristic	Controlled (n = 25)	Uncontrolled (n = 27)	p-value
Age, years, mean (SD)	55.7 (12.5)	58.6 (10.1)	0.369
Male sex, n (%)	13 (52.0)	13 (48.1)	0.781
Marital status			0.982
— Single	6 (24.0)	7 (25.9)	
— Married	13 (52.0)	14 (51.9)	
— Widowed/Divorced	6 (24.0)	6 (22.2)	
Education level			0.614
— None	8 (32.0)	12 (44.4)	
— Primary	6 (24.0)	3 (11.1)	
— Secondary	5 (20.0)	5 (18.5)	
— Tertiary	6 (24.0)	7 (25.9)	
Urban residence, n (%)	11 (44.0)	12 (44.4)	0.974
Current smoking, n (%)	2 (8.0)	6 (22.2)	0.155
Alcohol use, n (%)	9 (36.0)	7 (25.9)	0.432
Regular physical activity, n (%)	5 (20.0)	9 (33.3)	0.279
Poor treatment adherence, n (%)	9 (36.0)	15 (55.6)	0.158
Body mass index, kg/m^2 , mean (SD)	25.5 (4.8)	27.9 (4.2)	0.059
Known hypertension duration, years, mean (SD)	6.8 (6.6)	6.4 (4.7)	0.802
Associated diabetes, n (%)	4 (16.0)	7 (25.9)	0.381
Chronic kidney disease, n (%)	3 (12.0)	5 (18.5)	0.515

4. Discussion

In this slightly more than half of the hypertensive patients presented with uncontrolled blood pressure at admission, a proportion broadly in line with hospital-based figures reported across West Africa, where control rates among treated hypertensive patients often fall between 30% and 50%.

The trend toward association between higher body mass index and poor blood pressure control mirrors a consistent finding in the hypertension literature from sub-Saharan Africa, where rising obesity prevalence, particularly in urban settings, is increasingly recognized as a driver of treatment-resistant hypertension. Excess adiposity contributes to poor control through several intertwined mechanisms, including increased sympathetic activity, sodium retention, and reduced responsiveness to antihypertensive therapy.

The trend observed for smoking is also consistent with prior work linking tobacco use to sustained sympathetic activation and reduced antihypertensive efficacy, although the wide confidence interval in this small sample precludes any firm conclusion. Similarly, the association between poor treatment adherence and uncontrolled blood pressure replicates one of the most robust and repeatedly documented findings in hypertension research globally, and remains a central target for clinical intervention

regardless of statistical significance in any single small study.

Notably, none of the associations reached conventional statistical significance in this dataset. This should be interpreted primarily as a reflection of limited statistical power, given a sample of only 52 patients and 27 outcome events, rather than as evidence against a true association. This point is itself pedagogically important: a p-value above 0.05 in a small sample does not equate to the absence of a clinically meaningful effect, and effect sizes (odds ratios) should always be interpreted alongside their confidence intervals rather than through significance testing alone.

Table 2. Multivariable logistic regression for poor blood pressure control

Variable	Adjusted OR	95% CI	p-value
Age (per year)	1.02	0.97–1.08	0.475
Male sex (ref: Female)	1.14	0.34–3.83	0.835
Body mass index (per kg/m ²)	1.14	0.99–1.31	0.066
Current smoking (ref: No)	2.79	0.48–16.25	0.254
Poor treatment adherence (ref: Good)	2.24	0.66–7.59	0.193

Beyond this fundamental caveat, the small sample size limited statistical power and the number of covariates that could reasonably be entered into the multivariable model without overfitting, following the classical rule of at least ten outcome events per predictor variable.

5. Conclusion

This study analyse a factors-associated cross-sectional study applied to blood pressure control, from descriptive statistics through bivariate comparisons to multivariable logistic regression. Although no factor reached strict statistical significance in this small sample, the trends observed for body mass index, smoking, and treatment adherence align with the broader international literature on hypertension control.

Declarations

Conflict of interest : No

Funding : No

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How to cite this article: Balogun P. Factors Associated with Poor Blood Pressure Control Among Hypertensive Patients Managed in the Internal Medicine Department of Gwawino General Hospital, Nigeria. *Baobab Health*. 2026;1(1):21-23.