

Prevalence of Hypertension among Inmates at Labé Civil Prison

Thierno Mamadou Cherif Diallo¹, Namandian Traore², Ousmane Camara³, Sia Marie Ouendeno², Ousmane Soumah², Djenabou Bah², Sambou Oulare⁴, Marie Rose Lamah², Idiatou Balde²

¹Department of Forensic Medicine, Regional Hospital of Conakry, Conakry, Guinea

²Department of Forensic Medicine, Donka National Hospital, Conakry, Guinea

³Ignace Deen National Hospital, Conakry, Guinea

⁴Ministry of Health and Public Hygiene, Conakry, Guinea

Email: mamadoma2012@yahoo.fr

How to cite this paper: Diallo, T.M.C., Traore, N., Camara, O., Ouendeno, S.M., Soumah, O., Bah, D., Oulare, S., Lamah, M.R. and Balde, I. (2026) Prevalence of Hypertension among Inmates at Labé Civil Prison. *World Journal of Cardiovascular Surgery*, 16, 139-147.

<https://doi.org/10.4236/wjcs.2026.169014>

Received: July 27, 2026

Accepted: September 18, 2026

Published: September 21, 2026

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Abstract

Introduction: Hypertension is a major global public health problem because of its high prevalence and its role in the development of cardiovascular, renal, and cerebrovascular diseases. People living in correctional facilities represent a particularly vulnerable population due to the high prevalence of cardiovascular risk factors and the specific conditions of incarceration. This study aimed to determine the prevalence of hypertension and identify its associated risk factors among inmates at the Labé Civil Prison, Guinea. **Patients and Methods:** A cross-sectional descriptive study was conducted at the Labé Civil Prison over a three-month period. The study included all inmates who voluntarily agreed to participate. Sociodemographic characteristics, medical history, lifestyle habits, anthropometric measurements, and blood pressure values were collected using a standardized questionnaire. Both quantitative and qualitative variables were analyzed. **Results:** A total of 302 inmates were included in the study. Among them, 27 (8.90%) were diagnosed with hypertension, defined as a systolic blood pressure ≥ 140 mmHg and/or a diastolic blood pressure ≥ 90 mmHg. The mean age of hypertensive participants was 48.91 ± 12.24 years, ranging from 22 to 69 years. The main risk factors associated with hypertension were diabetes mellitus, obesity, older age, and over weight. **Conclusion:** Hypertension remains an important public health concern among inmates at the Labé Civil Prison. The prevalence observed in this study highlights the need for systematic screening, early diagnosis, and appropriate management of cardiovascular risk factors in correctional settings in order to prevent hypertension-related complications and improve the health status of this vulnerable population.

Keywords

Hypertension, Prevalence, Inmates, Labé Civil Prison, Risk Factors, Obesity, Diabetes Mellitus, Guinea

1. Introduction

Hypertension (HTN) is one of the leading public health problems world wide because of its high prevalence and its major role in the development of cardiovascular and neurological complications. According to the World Health Organization (WHO), more than 1.28 billion adults aged 30 - 79 years are living with hypertension, with nearly two-thirds residing in low- and middle-income countries. Despite advances in screening and management, hypertension remains one of the leading causes of premature death world wide [1].

In sub-Saharan Africa, hypertension represents a major public health challenge. The WHO African Region continues to have one of the highest prevalence rates globally, driven by rapid urbanization, nutritional transition, physical inactivity, population aging, and the increasing prevalence of cardiovascular risk factors [2]. In Guinea, Baldé M.D. and colleagues reported an overall hypertension prevalence of 31.4% in the general population, with a higher prevalence in urban areas (43.6%) than in rural areas (14.9%) [3].

People deprived of their liberty constitute a particularly vulnerable population with respect to non-communicable diseases, especially hypertension. Conditions of imprisonment, chronic stress, over crowding, insufficient physical activity, often unbalanced diets, tobacco use, alcohol or psychoactive substance consumption prior to incarceration, and limited access to health care all contribute to an increased risk of developing hypertension and its complications.

Several prison-based studies have shown that the prevalence of hypertension among inmates is often higher than that observed in the general population. In Nigeria, a study conducted at Kano Prison reported a hypertension prevalence of approximately 30% among incarcerated individuals [4]. In Ghana, studies conducted among incarcerated populations have reported a substantial burden of cardiovascular risk factors, including hypertension. Abukari *et al.* assessed cardiovascular risk among people living in prison in the Northern Region, while Achoo *et al.* reported a high prevalence of hypertension and identified several associated cardiovascular risk factors, including over weight, obesity, diabetes mellitus, tobacco use, alcohol consumption, and physical inactivity [5] [6]. Cardiovascular diseases, including hypertension, have also been recognized as an important health concern among incarcerated populations, reflecting the combined effects of prison conditions and cardiovascular risk factors [7].

In Guinea, however, data on hypertension in correctional settings remain very limited. To our knowledge, no published study has specifically assessed the prevalence of hypertension among inmates at Labé Civil Prison. Yet, this correctional

facility houses a population that is likely to be exposed to several cardiovascular risk factors related to prison conditions and the sociodemographic characteristics of incarcerated individuals.

Against this background, the present study was conducted at Labé Civil Prison. Its objectives were to determine the prevalence of hypertension among inmates and to identify the main associated risk factors. The findings of this study are expected to contribute to improving strategies for the early detection, prevention, and management of hypertension in correctional settings in Guinea, while providing valuable evidence for health and prison authorities to support the development of policies tailored to this particularly vulnerable population.

2. Patients and Methods

2.1. Study Design and Duration

The study was conducted at Labé Civil Prison, located in the administrative region of Labé, Republic of Guinea. This was a descriptive cross-sectional study carried out over a period of three (3) months, from March 13 to June 13, 2026.

2.2. Study Population

The study population consisted of all inmates aged 18 years and older who were present at Labé Civil Prison during the study period and who agreed to participate after providing written informed consent.

2.3. Inclusion Criteria

The study included all inmates who:

- were aged 18 years or older;
- were present at Labé Civil Prison during the study period;
- provided free and informed consent to participate.

2.4. Exclusion Criteria

The following individuals were excluded:

- inmates who declined to participate in the study;
- inmates whose health condition did not allow the interview or the required measurements to be performed;
- participants with incomplete data records.

2.5. Sampling

The study included all inmates who met the eligibility criteria during the study period. A total population (exhaustive) sampling approach was adopted to recruit all eligible participants. No stratified sampling was performed because the prison population was relatively small and readily accessible.

2.6. Data Collection

Data were collected using a standardized questionnaire administered individually

by trained investigators. The information collected included:

- sociodemographic characteristics (age, sex, educational level, and occupation before incarceration);
- personal and family history of hypertension, diabetes mellitus, and cardiovascular diseases;
- lifestyle factors (smoking, alcohol consumption, and physical activity);
- anthropometric measurements (weight, height, and body mass index [BMI]);
- blood pressure measurements.

2.7. Definition of Hypertension

Hypertension (HTN) was defined according to international guidelines as a systolic blood pressure (SBP) ≥ 140 mmHg and/or a diastolic blood pressure (DBP) ≥ 90 mmHg.

Participants were classified into two categories:

- **Previously diagnosed hypertension:** inmates with a prior diagnosis of hypertension, whether or not they were receiving antihypertensive treatment.
- **Newly diagnosed hypertension:** inmates with no known history of hypertension who had an SBP ≥ 140 mmHg and/or a DBP ≥ 90 mmHg during the study.
- Hypertension was further classified according to the European Society of Cardiology (ESC) recommendations:
- **Grade 1 (mild):** SBP 140 - 159 mmHg and/or DBP 90 - 99 mmHg;
- **Grade 2 (moderate):** SBP 160 - 179 mmHg and/or DBP 100 - 109 mmHg;
- **Grade 3 (severe):** SBP ≥ 180 mmHg and/or DBP ≥ 110 mmHg.

2.8. Blood Pressure Measurement

Blood pressure was measured using a validated automated electronics sphygmomanometer. Each participant was seated comfortably after resting for 5 - 10 minutes. Two consecutive blood pressure measurements were obtained 15 minutes apart, following international recommendations. The average of the two measurements was used for the analysis.

2.9. Anthropometric Measurements

Body weight was measured using a calibrated weighing scale, while height was measured with a stadiometer with participants barefoot and wearing light clothing. Body mass index (BMI) was calculated using the Quetelet formula:

$$\text{BMI} = \text{Weight (kg)} / \text{Height}^2 (\text{m}^2)$$

Participants were classified according to the World Health Organization (WHO) BMI criteria:

- Under weight: BMI < 18.5 kg/m²;
- Normal weight: BMI 18.5 - 24.9 kg/m²;
- Over weight: BMI 25.0 - 29.9 kg/m²;
- Obesity: BMI ≥ 30.0 kg/m².

2.10. Assessment of Hypertension-Related Complications

The hypertension-related complications assessed included:

- history of stroke;
- history of hypertensive heart disease;
- signs and symptoms of heart failure;
- renal impairment, when laboratory investigations were available.

2.11. Statistical Analysis

Data were entered and analyzed using appropriate statistical software. Categorical variables were expressed as frequencies and percentages, whereas continuous variables were presented as means $\pm$ standard deviations (SD) or medians, depending on their distribution.

2.12. Ethical Considerations

The study was conducted after obtaining authorization from the administrative and health authorities of Labé Civil Prison. Written informed consent was obtained from each participant before enrollment. All collected data were anonymized and handled in strict accordance with confidentiality requirements and the ethical principles governing biomedical research.

3. Results

During the study period, 302 inmates from Labé Civil Prison were enrolled. Among them, 27 (8.90%) had hypertension, defined as a systolic blood pressure (SBP) ≥ 140 mmHg and/or a diastolic blood pressure (DBP) ≥ 90 mmHg.

The mean age of hypertensive inmates was 48.91 ± 12.24 years, ranging from 22 to 69 years (**Table 1**). Males were largely predominant, accounting for 85.18% of hypertensive participants, with a male-to-female ratio of 5.75:1. This predominance reflects the high proportion of men in the prison population.

Table 1. Distribution of participants according to sociodemographic characteristics and body mass index (BMI).

Variables	Number (n)	%
HTN (+)	27	8.9
HTN (–)	275	91.1
Age of hypertensive participants (years)	27	100
]30 - 45[	11	40.7
[45 - 60[	12	44.4
[≥ 60]	4	14.9
Mean age	48.91 ± 12.24 years	
Age range	22 - 69 years	

Continued

Sex	27	100
Male	23	85.18
Female	4	14.82
Body Mass Index (BMI, kg/m²)	27	100
≤24	19	70.37
25 - 30	5	18.52
>30	3	11.11

The mean body mass index (BMI) was 18.65 kg/m², with values ranging from 15 to 36 kg/m². Among the hypertensive participants, 3 inmates (11.11%) were classified as obese.

According to the European Society of Cardiology (ESC) classification, Grade 1 hypertension was the most common form, accounting for 62.96% of cases among men and 11.11% among women (**Table 2**).

The main risk factors associated with hypertension identified among inmates were diabetes mellitus and obesity, followed by over weight and advanced age (**Table 3**).

Table 2. Distribution of hypertensive participants according to hypertension grade.

Hypertension Grade	Male, n (%)	Female, n (%)
Grade I	17 (62.96%)	3 (11.11%)
Grade II	4 (14.8%)	0 (0.00%)
Grade III	2 (7.41%)	1 (3.7%)

Table 3. Analysis of risk factors associated with hypertension.

Risk Factors	OR	95% CI	P-value
Diabetes mellitus	11.33	2.1680 - 59.2407	0.011
Stress	0.33	0.5781 - 3.0754	0.498
High-salt diet	0.62	0.2255 - 1.6898	0.344
Physical inactivity	0.59	0.2642 - 1.3095	0.190
Obesity	34.25	3.4239 - 342.0779	0.000
Tobacco smoking	1.68	0.4647 - 6.1034	0.430

4. Discussion

The present study, conducted at Labé Civil Prison in Guinea, aimed to determine the prevalence of hypertension (HTN) and identify the associated risk factors

among incarcerated individuals. Of the 302 inmates enrolled, 27 were hypertensive, corresponding to a prevalence of 8.9%. This prevalence is relatively low compared with findings reported in several prison-based studies. In Ghana, Achoo and colleagues reported a hypertension prevalence of 27.2% among inmates from six correctional facilities in the Ashanti Region [6]. The authors attributed this high prevalence to the coexistence of several cardiovascular risk factors, including over weight, obesity, tobacco use, alcohol consumption, chronic stress, physical inactivity, and inadequate medical follow-up in correctional settings. Similarly, in Nigeria, Agu and colleagues reported a substantially higher prevalence of 73.7% among inmates in Nigerian correctional facilities [4]. The marked difference compared with our findings may be explained by differences in the sociodemographic characteristics of the study populations, including an older mean age, longer duration of incarceration, and a higher prevalence of cardiovascular risk factors, as well as methodological differences related to diagnostic criteria and blood pressure measurement procedures.

In the United States, Culpepper and Froom reported a hypertension prevalence of approximately 6% among adult male inmates [8], a figure relatively close to that observed at Labé Civil Prison. This similarity may be related to the relatively young age of the study population and the low proportion of inmates with obesity or other major cardiovascular risk factors.

The relatively low prevalence observed in our study may therefore be explained by the young age of the prison population, the relatively short duration of incarceration for many inmates, and the low prevalence of obesity in our sample. Nevertheless, this finding should not lead to an underestimation of the importance of hypertension in correctional settings. Several authors have emphasized that incarcerated individuals are at increased risk of developing cardiovascular diseases because of prison conditions, chronic stress, unhealthy lifestyle behaviors, and often limited access to health care services [8].

In the present study, the mean age of hypertensive inmates was 48.91 ± 12.24 years, with the highest proportion occurring among individuals aged 45 - 60 years. This finding is consistent with previous studies demonstrating that the prevalence of hypertension increases progressively with age. A meta-analysis conducted by Olowoyo and colleagues in Africa confirmed that advancing age is one of the strongest determinants of hypertension [9].

Men accounted for 85.18% of hypertensive cases in our study. This predominance is primarily attributable to the composition of the prison population at Labé Civil Prison, where males constitute the overwhelming majority, rather than to an inherent sex-related difference in susceptibility to hypertension.

Regarding associated risk factors, our study demonstrated statistically significant associations between obesity, diabetes mellitus, and hypertension. These findings are consistent with those reported by Achoo and colleagues in Ghana, who identified over weight, obesity, diabetes mellitus, tobacco use, excessive alcohol consumption, and physical inactivity as the principal factors associated with hypertension among inmates [6]. These observations further emphasize the major

contribution of metabolic and behavioral risk factors to the development of hypertension, even with incorrecional settings.

Further more, most hypertensive participants in our study had Grade 1 hypertension, indicating that the disease was detected at a relatively early stage. This finding provides an opportunity to strengthen secondary prevention strategies, including the promotion of healthy dietary habits, reduction of salt intake, smoking cessation, reduction of alcohol consumption, encouragement of physical activity whenever prison conditions permit, and regular medical follow-up.

Based on these findings, systematic screening for hypertension should be strengthened at the time of admission to Labé Civil Prison and repeated regularly throughout incarceration. Early identification of high-risk individuals and appropriate management of cardiovascular risk factors could contribute to reducing the occurrence of cardiac, cerebrovascular, and renal complications in this particularly vulnerable population.

5. Conclusions

This study, conducted at Labé Civil Prison, determined the prevalence of hypertension among incarcerated individuals and identified the main associated risk factors. The observed prevalence of 8.9% indicates that hypertension is present within the prison population, although it remains lower than that reported in several other African prison-based studies.

The findings highlight the important role of factors such as advanced age, obesity, and diabetes mellitus in the occurrence of hypertension among inmates. The predominance of Grade 1 hypertension underscores the value of early screening, allowing timely management before the onset of cardiovascular, renal, and cerebrovascular complications.

In light of these findings, strengthening health promotion and disease prevention activities within Labé Civil Prison is essential. Implementing systematic hypertension screening upon prison admission, combined with regular medical follow-up, health education, and effective management of cardiovascular risk factors, could substantially improve the health status of incarcerated individuals and reduce the burden of hypertension-related complications.

Finally, this study represents one of the first available reports on hypertension in correctional settings in Guinea. It may serve as a reference for future large-scale multicenter studies and contribute to the development of national strategies for the prevention and management of cardiovascular diseases in correctional facilities across the country.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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