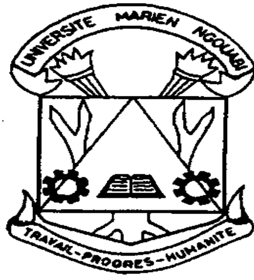

ANNALES DE L'UNIVERSITE MARIEN NGOUABI

Sciences de la Santé

VOL. 26, N° 1 – ANNEE: 2026

ISSN: 1815 – 4433 - www.annales-umng.org

ANNALES
DE L'UNIVERSITE MARIEN NGOUABI

SCIENCES DE LA SANTE

VOLUME 26, NUMERO 1, ANNEE: 2026 **www.annales-umng.org**

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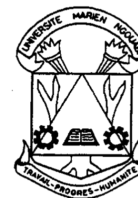
Annales de l'Université Marien NGOUABI, 2026 : 1 - 13
Sciences de la Sante
ISSN : 1815 – 4433
www.annales-umng.org



CLINICAL AND PARACLINICAL PROFILE OF HEART FAILURE PATIENTS AT LAQUINTINIE HOSPITAL, DOUALA, CAMEROON, 2025: A CROSS-SECTIONAL STUDY

PROFIL CLINIQUE ET PARACLINIQUE DES PATIENTS INSUFFISANTS CARDIAQUES A L'HOPITAL LAQUINTINIE DE DOUALA, CAMEROUN, 2025 : UNE ÉTUDE TRANSVERSALE

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RESUME

Objective: *Heart failure (HF) is a major public health issue in sub-Saharan Africa. This study aimed to describe the clinical and paraclinical aspects of patients hospitalised for HF at Laquintinie Hospital in Douala, Cameroon in 2025.*

Methods: *This was a descriptive cross-sectional study including patients hospitalised for HF who underwent echocardiography from January to December 2025. Demographic, clinical, paraclinical, and outcome variables were collected using standardised forms. Results were expressed as medians (interquartile ranges) and frequencies (percentages).*

Results: *Of 248 HF admissions, 193 patients (77.8%) with echocardiography were included. Median age was 65 years (52-75), with 50.8% male. Main symptoms were dyspnoea (88.1%) and fatigue (62.7%); 80.8% were NYHA class III-IV. Major comorbidities included hypertension (49.2%) and prior HF (31.1%). Dominant aetiologies were dilated cardiomyopathy (28%) and hypertensive heart disease (15%), with precipitating factors being arrhythmias (22.8%) and pulmonary infections (19.7%). HF types included reduced ejection fraction (HFrEF, 44.6%), preserved (HFpEF, 36.3%), and mildly reduced (HFmrEF, 19.2%). Echocardiography showed median left ventricular diastolic diameter of 55.5 mm, Simpson EF of 34.4%, increased left ventricular mass (216.5 g), and pulmonary artery systolic pressure (55 mmHg). In-hospital mortality was 16.1%, with median length of stay 6 days.*

Conclusion: *HF in this urban setting presents at an advanced stage, dominated by HFrEF of hypertensive or dilated origin, with marked paraclinical abnormalities and high mortality. These findings advocate for strengthened hypertension control and early management of infections and arrhythmias.*

Keywords: *Heart failure, Cameroon, echocardiography, hypertensive heart disease, dilated cardiomyopathy, in-hospital mortality*

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ABSTRACT

***Objectif** : L'insuffisance cardiaque (IC) est un problème majeur de santé publique en Afrique subsaharienne. Cette étude visait à décrire les aspects cliniques et paracliniques des patients hospitalisés pour IC à l'Hôpital Laquintinie de Douala, Cameroun en 2025.*

***Méthodes** : Il s'agissait d'une étude transversale descriptive incluant les patients hospitalisés pour IC ayant bénéficié d'une échocardiographie de janvier à décembre 2025. Les variables démographiques, cliniques, paracliniques et évolutives ont été collectées à l'aide de formulaires standardisés. Les résultats ont été exprimés en médianes (écarts interquartiles) et fréquences (pourcentages).*

***Résultats :** Sur 248 admissions pour IC, 193 patients (77,8%) avec échocardiographie ont été inclus. L'âge médian était de 65 ans (52-75), avec 50,8% d'hommes. Les principaux symptômes étaient la dyspnée (88,1%) et la fatigue (62,7%); 80,8% étaient en classe NYHA III-IV. Les principales comorbidités comprenaient l'hypertension (49,2%) et les antécédents d'IC (31,1%). Les étiologies dominantes étaient la cardiomyopathie dilatée (28%) et la cardiopathie hypertensive (15%), avec comme facteurs précipitants les arythmies (22,8%) et les infections pulmonaires (19,7%). Les types d'IC comprenaient une fraction d'éjection réduite (ICFER, 44,6%), préservée (ICFEP, 36,3%) et légèrement réduite (ICFELR, 19,2%). L'échocardiographie a montré un diamètre diastolique ventriculaire gauche médian de 55,5 mm, une FE Simpson de 34,4%, une masse ventriculaire gauche augmentée (216,5 g) et une pression artérielle pulmonaire systolique de 55 mmHg. La mortalité hospitalière était de 16,1%, avec une durée médiane de séjour de 6 jours.*

***Conclusion :** L'IC dans ce contexte urbain se présente à un stade avancé, dominée par l'ICFER d'origine hypertensive ou dilatée, avec des anomalies paracliniques marquées et une mortalité élevée. Ces observations plaident pour un renforcement du contrôle de l'hypertension et une prise en charge précoce des infections et des arythmies.*

***Mots-clés :** Insuffisance cardiaque, Cameroun, échocardiographie, cardiopathie hypertensive, cardiomyopathie dilatée, mortalité hospitalière*

INTRODUCTION

Heart failure (HF) is a major global public health problem, affecting more than 64 million people worldwide and representing one of the leading causes of hospitalisation and mortality, particularly among older adults in high-income countries [1]. HF represents a growing epidemic in sub-Saharan Africa (SSA), driven by the dual burden of communicable and non-communicable diseases [2,3]. In Sub-Saharan Africa, hospital-based studies consistently show HF accounting for 3.7-19.0% of medical admissions, with high morbidity and mortality in young-to-middle-aged adults [4].

Unlike high-income countries where ischaemic heart disease predominates [5], SSA profiles are dominated by dilated cardiomyopathy (10.9-46.9%) and hypertensive heart disease (HHD, 4.5-39.0%), with rheumatic valvular disease in up to 19.7% of cases [3].

Recent data from semi-urban Cameroonian settings like Buea (2025) report a mean age of 60.3 years for heart failure patients, with hypertensive heart disease as the leading cause (41.7%), followed by ischemic heart disease (15%). In-hospital mortality was 11.9%, and the median length of stay was seven days [6]. In contrast, urban centres like Douala face additional challenges, such as rapid urbanisation, poor hypertension control, delayed presentation, and limited access to advanced diagnostics, that may shape a different heart failure profile. Recent hospital-level data from Laquintinie Hospital in Douala from 2021-2024 [7,8] reveal a slightly older median age (63 years) and a lower proportion of hypertensive heart disease (28.5–33.0%), but a higher in-hospital mortality (11.7-17.0%) and longer median stay (8 days). Across both settings, and indeed most of sub-Saharan Africa, echocardiographic, electrocardiographic, and biological data remain virtually absent from routine reports, limiting comprehensive phenotyping and adherence to modern heart failure guidelines [3,6–8].

These urban–semi-urban differences highlight the need for recent data to become available to explore evolving aetiologies, treatment patterns, and outcomes across Cameroonian settings. This study addresses that gap by providing a 2025 snapshot at Laquintinie Hospital (LH), Cameroon's largest public referral centre in the economic capital. The objectives were: to describe socio-demographic and clinical profiles; to describe aetiologies and precipitants; to describe HF types per universal definition; and to describe detailed echocardiographic, ECG, and biological characteristics, while highlighting implications for resource-limited care.

METHODS

The study adheres fully to STROBE guidelines for cross-sectional observational research.

Study design and setting: This was a descriptive cross-sectional study conducted at the Cardiology unit of Laquintinie Hospital (LH), Douala, covering all HF admissions in 2025. LH is a 500-bed tertiary public hospital serving ~2 million urban and peri-urban residents, with echocardiography and basic laboratory facilities but limited cardiac MRI or coronary angiography.

Participants: No particular sampling technique was used as exhaustive inclusion was preferred due to the anticipated small number of admissions.

- Inclusion: All adults (≥18 years) hospitalised with a clinical diagnosis of HF (Framingham or ESC criteria) who

underwent transthoracic echocardiography during the index admission.

- Exclusion: Missing echocardiographic report and incomplete records.

VARIABLES

- Demographics: Age, sex, marital status, residence, profession, education, income.
- Clinical: NYHA class, symptoms (dyspnoea, fatigue, oedema, cough, chest pain, palpitations), physical signs (crackles, jugular distension, oedema), comorbidities (hypertension, diabetes, prior HF), precipitants (arrhythmia, infection, non-adherence).
- Paraclinical: Echocardiography (Vivid or equivalent machines; Simpson biplane EF, LV dimensions per ASE guidelines, diastolic parameters, PASP via tricuspid regurgitation). ECG (rhythm, hypertrophy, ischaemia). Biology (haemoglobin, creatinine, electrolytes, CRP).
- Outcome: In-hospital mortality, and length of stay.

DATA SOURCES: Hospital registers, medical charts, echo/ECG reports, lab results. Collection via standardised Excel form by two trained physicians; double-entry verification to minimise extraction bias. Missing data coded as “NS” (not specified); no imputation was conducted.

STATISTICAL METHODS: Analyses used R v4.4.1 (descriptive only). Continuous variables were presented as median and interquartile range (Q1-Q3). Categorical variables were presented as frequency (percentage). No hypothesis testing was performed and as such significance threshold was not applicable.

ETHICS: The Regional Human Health Research Ethics Committee for the Littoral (ref: 2024/CE/CRH-LITTORAL) approved the study. Informed consent was waived due to the observational nature of the design. Data were anonymised. This study was conducted according to guiding principles of the Declarations of Helsinki.

RESULTS

PARTICIPANT FLOW: A total of 248 patients were admitted for HF; 193 (78%) had echocardiography and were analysed. In total, 55 cases were excluded due to lack of echocardiography (due to technical unavailability or early discharge/death) or lack of

laboratory values as shown in Figure 1.

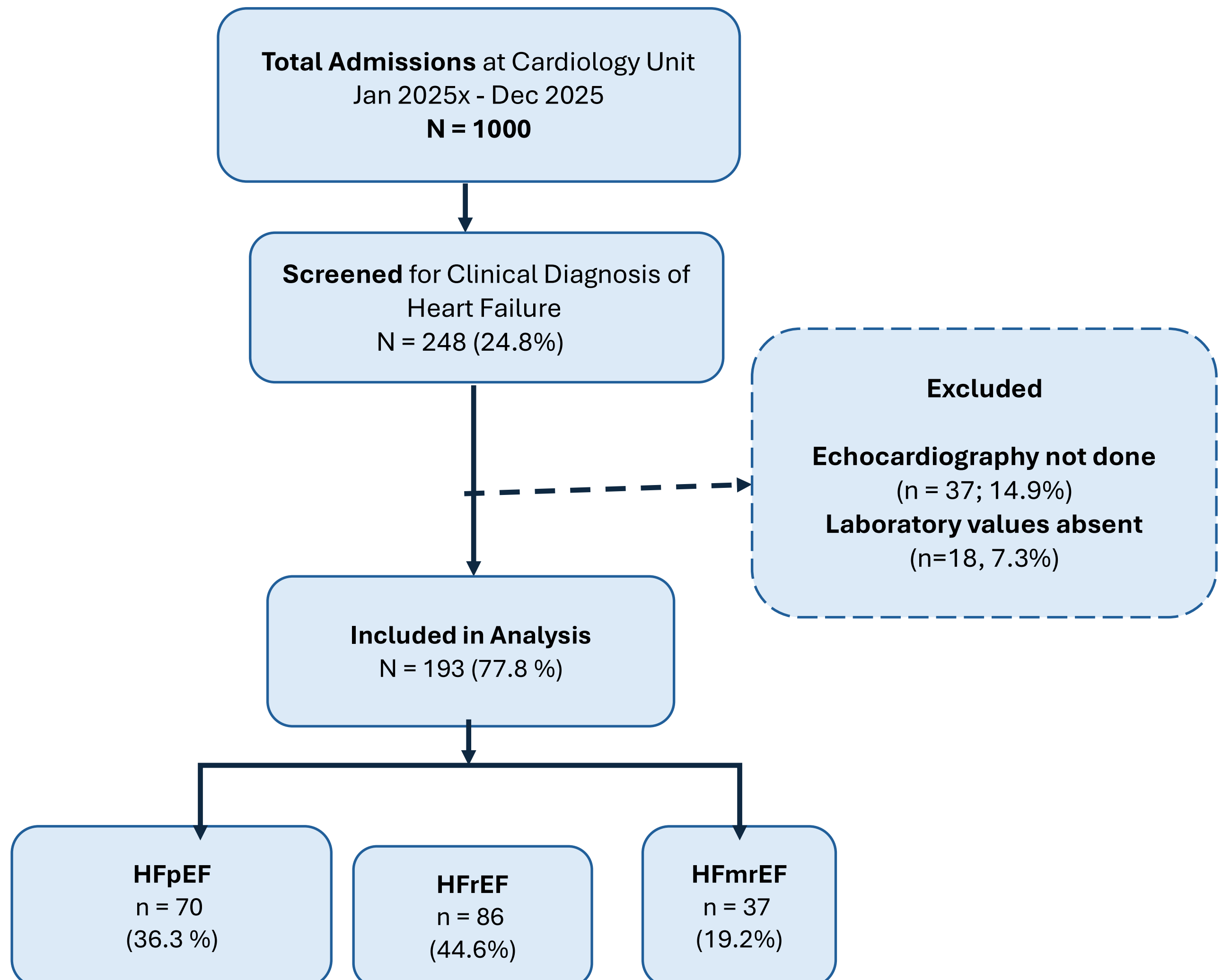


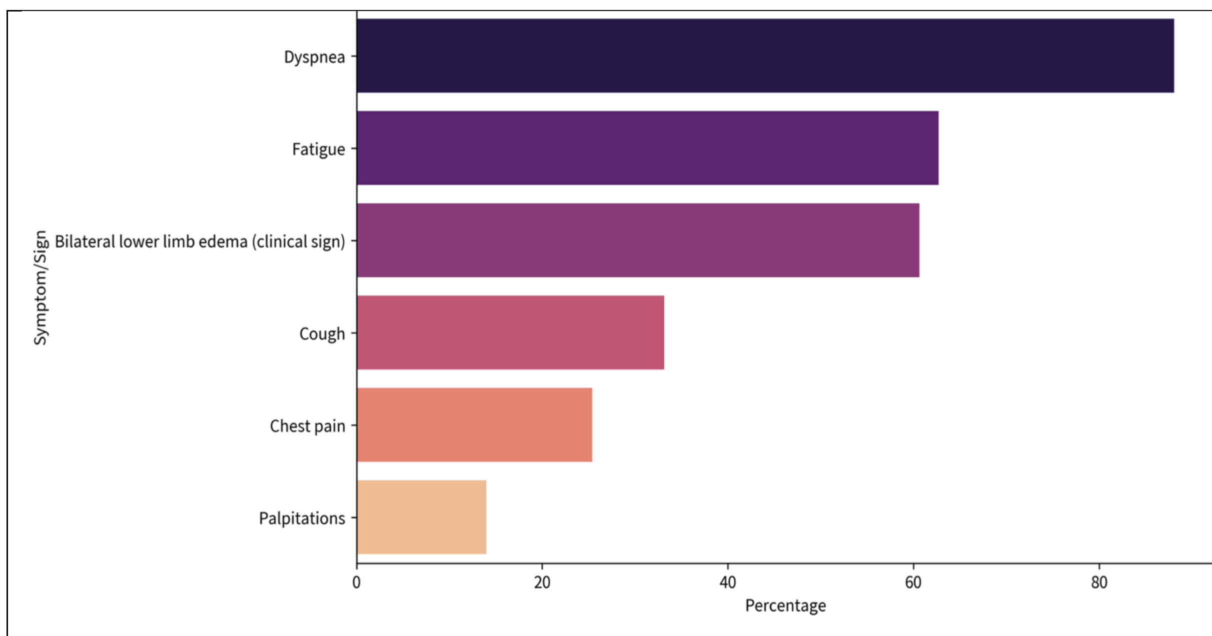
Figure 1: Recruitment flowchart

Socio-demographic characteristics: Median age was 65 years (52-75; range 19-115). Balanced sex ratio (50.8% male). 85.5% resided in Douala; 59.7% were workers of the informal sector; 46.1% were educated at university level; 47.2% had monthly household income ranging between 50,000-100,000 FCFA (~USD 80-160)

Table I: Socio-demographic characteristics (n=193)

Characteristic	Frequency	Percentage
Sex (male)	98	50.8
Married	109	56.5
Residence = Douala	165	85.5
Worker in the Informal sector	111	59.7
University level education	89	46.1
Monthly household income: 50-100k FCFA	91	47.2

Clinical presentation: Of all patients, 80.8% were in NYHA stages III-IV. Dominant symptoms included dyspnoea (88.1%), fatigue (62.7%), and lower-limb oedema (33.2% reported; 60.6% bilateral pitting pedal oedema on exam). On physical examination, predominant signs included bilateral basal crackles (66.3%), jugular distension (43.5%), while hepatomegaly/ascites was rare as shown in Figure 2.



Symptoms/signs included dyspnoea, fatigue, oedema, crackles, jugular distension, cough, chest pain, palpitations

Figure 2: Main symptoms/signs in patients admitted for HF at Laquintinie in 2025**.**

Comorbidities: Hypertension was the commonest comorbidity (49.2%) followed by **a history of prior HF (31.1%, n=60 – defined as a documented HF episode before the current admission),** and diabetes (14.5% with target-organ damage in 3.6%), chronic kidney disease (3.6%), and HIV 3.6%. Few patients had a history of ischaemic heart disease (4.2%) or stroke (4.2%).

Aetiologies and precipitants: Dilated cardiomyopathy predominated the aetiologies (28%), followed by hypertensive heart disease (15%), Cor pulmonale (10.4%), and restrictive cardiomyopathy (9.3%). Precipitants included arrhythmias (22.8%), pulmonary infections (19.7%), therapeutic non-adherence (17.6%), and hypertensive emergency (7.8%) as shown in Table II

Heart failure phenotypes as shown in Figure 3:

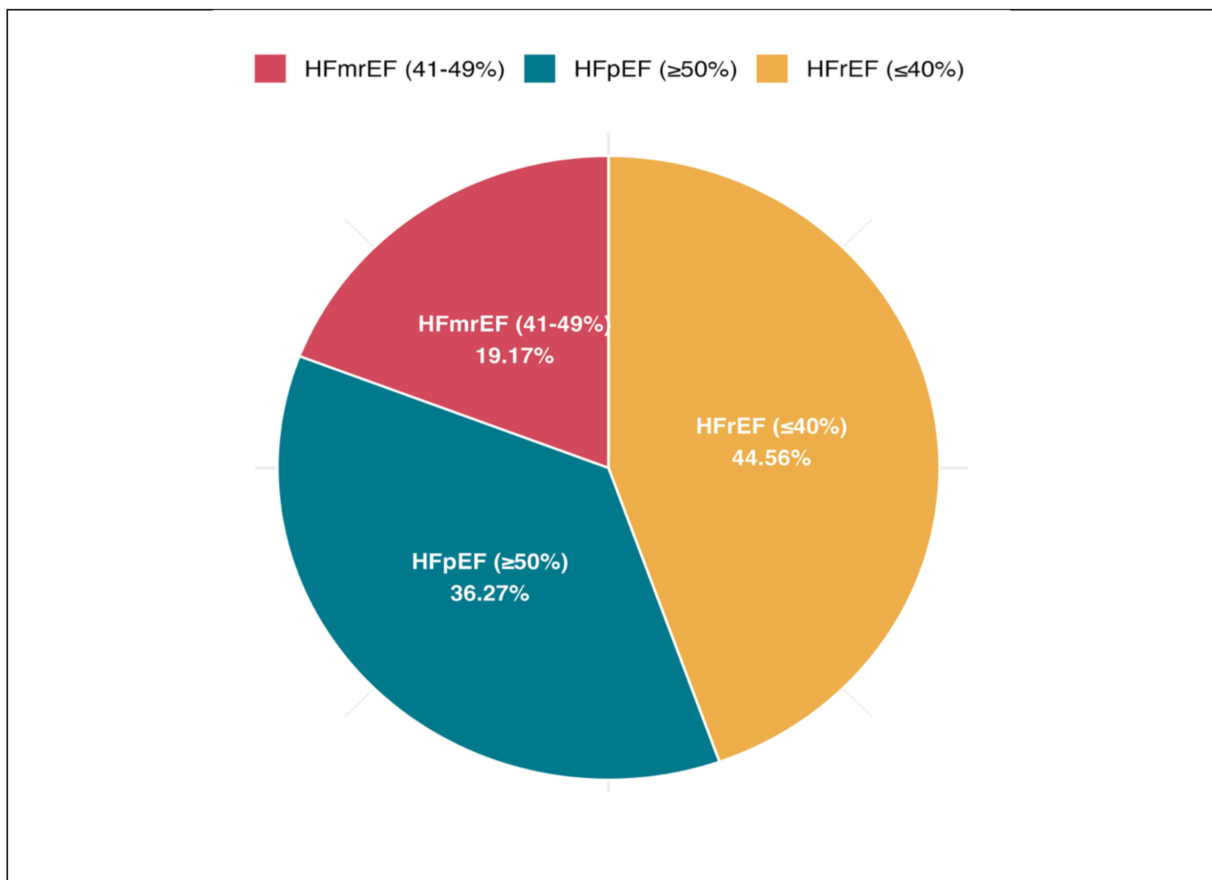


Figure 3: HF phenotype distribution

Echocardiographic findings: Median LV diastolic diameter 55.5 mm, Simpson EF 34.4% (24.2-44.5), LV mass 216.5 g (hypertrophy), E/e′ 11.5 (diastolic dysfunction), PASP 55 mmHg (moderate pulmonary hypertension). Left atrial diameter 34.7 mm; TAPSE 17.9 mm (preserved RV in most). Pericardial effusion 9.3%; LV hypertrophy on echo 9.3% as shown in Table III.

Table III: Key echocardiographic parameters (medians, Q1-Q3; n=193)

Parameter	Median	Q1-Q3
LV diastolic diameter (mm)	55.5	42.9-80.1
Simpson EF (%)	34.4	24.2-44.5
LV mass (g)	216.5	173.3-678.0
E/e′	11.5	7.3-34.7
PASP (mmHg)	55.0	45.0-79.5
Left atrial diameter (mm)	34.7	21.6-65.2

LV= Left Ventricular; PASP= Pulmonary Artery Systolic Pressure; EF= Ejection Fraction.

ECG findings: Of 193 patients, 152 had an ECG (79%). Normal sinus rhythm was observed the most (43.4%), followed by atrial fibrillation (27%), sinus tachycardia (21.1%), Left Ventricular Hypertrophy (24.3%), and ischaemic changes (23.0%).

Biological parameters: Median Hb was 11.7 g/dL, median creatinine 14.8 mg/L, median natraemia was 135 mEq/L, and CRP was 48 mg/L as shown in Tableau IV.

Table IV. Selected biological parameters (medians, Q1-Q3)

Parameter	Median	Q1-Q3
Haemoglobin (g/dL)	11.7	10.2-16.8
Creatinine (mg/L)	14.8	10.7-92.4
Sodium (mEq/L)	135.0	132.0-162.9
CRP (mg/L)	48.0	12.0-311.5

Outcomes: Median hospital stay was 6 days with ranges from 4 to 39 days. In-hospital mortality 16.1% (31 deaths); 82.4% discharged home; 1% were discharged against advice; and 1% transferred to ICU.

DISCUSSION

This study possesses several strengths, including its prospective design, the recruitment of an exhaustive cohort of HF patients within a single calendar year (2025), and a robust level of phenotypic detail, enabled by standardised data collection. Selection bias was minimised by exhaustive inclusion of echo-confirmed cases (78% coverage). Information bias was reduced via standardised forms and objective echo/ECG measures. Recall bias was minimised as data was confirmed via chart review. No confounding adjustment

was needed due to the descriptive design. However, our findings must be interpreted in light of certain limitations. As a single-centre study conducted at a major public referral hospital in Douala, the results may not be fully generalisable to primary or private healthcare settings. Approximately 22% of patients did not undergo echocardiography, which may introduce a selection bias toward including clinically sicker patients in the echocardiographic sub-analyses. Moreover, patients did not undergo systematic coronary angiography, which does not formally exclude an ischaemic aetiology in some cases. The absence of long-term follow-up data precludes analysis of post-discharge outcomes, readmission rates, and survival. Finally, we acknowledge the lack of data on natriuretic peptides and advanced cardiac imaging, which would have provided additional diagnostic and prognostic precision.

This 2025 Douala cohort confirms that heart failure (HF) in urban Cameroon continues to present as an advanced-stage disease, characterized by a median age of 65 years, a predominance of severe functional impairment (80.8% in NYHA class III-IV), and a high prevalence of HF with reduced ejection fraction (HFrEF, 44.6%). The observed in-hospital mortality of 16.1% exceeds the 11.9% recently reported in semi-urban Buea, yet, remains consistent with the broader sub-Saharan African (SSA) range of 4-19% [3,6]. This disparity may reflect the more complex care challenges and delayed presentations associated with a major urban centre.

The etiological profile, with dilated cardiomyopathy (DCM) as the leading cause (28.0%) followed by hypertensive heart disease (HHD, 15.0%), is similarly reported in regional patterns [3]. This could be attributable to several factors. It may reflect local referral patterns, whereby patients with more severe, idiopathic systolic dysfunction are preferentially directed to a tertiary centre like Laquintinie Hospital. The significant contributions of cor pulmonale (10.4%) and restrictive patterns (9.3%) highlights the persistent burden of chronic lung disease and endemic pathologies such as endomyocardial fibrosis within this setting [9].

Our analysis of precipitating factors aligns with prior multicentre studies like THESUS-HF, identifying arrhythmias (22.8%) and infections (19.7%) as leading and potentially modifiable triggers [10]. These findings have clear and actionable implications for preventive strategies. The advanced disease state is corroborated by detailed echocardiographic evidence of severe cardiac remodelling, including dilated left ventricles, reduced ejection fraction, elevated pulmonary artery systolic pressure (PASP), and prevalent diastolic dysfunction. These features are consistent with a pattern of late presentation and prolonged untreated disease [11]. Complementary electrocardiographic abnormalities, notably atrial fibrillation (27%) and left ventricular hypertrophy (24%), provide further explanation for acute decompensations and highlight the substantial diagnostic value of routine ECG deployment in resource-limited settings [12,13]. Furthermore, the presence of biological inflammation (median CRP 48 mg/L) and prevalent anaemia reinforces the role of infection and inflammatory states as key drivers of hospitalisation [14,15].

The observed in-hospital mortality of 16.1% sits at the higher end of the SSA spectrum and must be contextualised against a short median stay of six days. This juxtaposition points to a healthcare model focused on acute stabilisation, likely constrained by limited access to comprehensive, guideline-directed medical therapy (including quadruple therapy) and step-down care [16].

CONCLUSION

In this urban setting, HF has a high mortality and presents an advanced stage disease profile, dominated by HFrEF of hypertensive or dilated aetiologies, with marked paraclinical abnormalities (LV remodelling and rhythm disorders) and precipitated by pulmonary infections. These observations call for a multi-armed public health and clinical response, including: the systematic implementation of hypertension screening and control programmes; improved access to affordable arrhythmia management, including rate control and anticoagulation; targeted infection prevention strategies, such as pneumococcal vaccination and prompt antibiotic therapy; the integration of routine echocardiography and ECG into standard HF care pathways; and the establishment of national HF registries to monitor evolving epidemiological trends, including the anticipated rise of ischaemic heart disease. Critically, even a contextualised implementation of existing care guidelines could play a pivotal role in reducing in-hospital mortality observed in this contemporary urban cohort.

DECLARATIONS

Acknowledgements:

The authors express their gratitude to the hospital administration for granting permission to conduct this study. Appreciation is also extended to the hospital staff for their cooperation and support throughout the data collection process.

Reporting Checklist:

The authors have completed the STROBE reporting checklist.

Data Availability Statement:

The data supporting the conclusions of this study are available from the corresponding author (SD) upon reasonable request.

FUNDING:

No external funding was received for this study.

CONFLICTS OF INTEREST:

The authors declare no competing interests.

ETHICAL APPROVAL:

Ethical approval was obtained from the Regional Human Health Research Ethics Committee for the Littoral (Reference: 2024/CE/CRERSH-LITTORAL). Informed consent was waived due to the retrospective nature of the study. All procedures adhered to relevant ethical guidelines and regulations for the use of anonymized secondary data.

AUTHOR CONTRIBUTIONS:

Concept and study design: SD and EMM. Data collection: EMM. Data analysis and interpretation: EMM. Manuscript drafting: All authors. Final manuscript approval: All authors Supervision: KF. SD and EMM had full access to all study data and take full responsibility for the integrity and accuracy of the data analysis. All authors have agreed to the submission of the manuscript in its current form.

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Table II: Main aetiologies and precipitants (n=193)

Category	Frequency	Pourcentage
Aetiologies		
Dilated cardiomyopathy	54	28.0
Hypertensive heart disease	29	15.0
Cor pulmonale	20	10.4
Restrictive cardiomyopathy	18	9.3
Ischaemic cardiomyopathy	14	7.3
Hypertrophic cardiopathy	6	3.1
Pericarditis and complications	5	2.6
Cardiorenal syndrome	3	1.6
Arrythmic cardiomyopathy	3	1.6
Others/unidentified aetiologies	43	22.1
Precipitants		
Arrhythmia	44	22.8
Pulmonary infection	38	19.7
Non-adherence/treatment interruption	34	17.6
Other infections	17	8.8
COPD or other lung pathologies	16	8.3
Hypertensive emergencies	15	7.8
Acute coronary syndrome	15	7.8
Renal pathology/worsening	12	6.2
Anaemia	13	6.7
Dietary transgression	6	3.1
Skin infections	5	2.6

COPD= Chronic Obstructive Pulmonary Disease