

# Epidemiological, Clinical, Therapeutic, and Evolutionary Aspects of Heart Failure in the Medical Department at Gao Regional Hospital

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## Abstract

**Introduction:** Heart failure is a major public health pandemic, particularly in Africa, where its prevalence continues to increase. In northern Mali, few data exist, hence the interest of this study with the objective of studying the epidemiological, clinical and therapeutic and evolutionary aspects of Heart failure at the regional hospital of Gao. **Patients and Methods:** This was a cross-sectional, descriptive study that took place from July 2022 to June 2023 in the medical department at Gao Hospital. **Results:** The hospital prevalence of heart failure was 44.1%. The mean age was  $47.30 \pm 20$  years (range: 16-88). Hypertension was the most common with 46.1%, followed by a sedentary lifestyle, and diabetes with 18.2% and 8.3% respectively; NYHA stage III-IV dyspnea was found in 83.9%. Reduced EF heart failure was present in 110 patients (76.9%), seventeen cases with moderately reduced EF (11.9%) and sixteen patients had preserved EF (11.2%). Global heart failure was the dominant (91.6%). The main etiologies of heart failure were dominated by hypertensive heart disease in 46 patients (32.2%), followed by postpartum cardiomyopathy with 43 cases (30.1%), primary dilated cardiomyopathy in 18 patients (12.6%), ischemic heart disease in 16 patients with 11.2%. Seven cases of valvular heart disease, or 4.9%. The evolution was favorable under treatment in 104 patients or 72.7%. In-hospital mortality was 14.7%. **Conclusion:** Heart failure is a common condition in sub-Saharan Africa, particularly in our country.

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## Keywords

Heart Failure, Epidemioclinical, Progressive, Gao Hospital

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### 1. Introduction

Heart failure (HF) is a major public health pandemic due to its prevalence and severity in terms of morbidity and mortality and its financial impact in terms of costs. Its incidence and prevalence are increasing due to the aging of the population [1]. Worldwide, its prevalence is estimated at more than 26 million people, of whom 17% to 45% die within a year [2]. Despite the many advances in drug and non-drug therapy [3]. In Africa, this prevalence continues to increase and can reach 40% in cardiology settings [4]. Particularly in developing countries, in proportion to the improvement in the socio-economic conditions of the populations [5]. Most of the African data comes mainly from hospital statistics, especially in French-speaking Africa [6]. The causes of this heart failure are multiple, in the 1990s they were dominated by rheumatic valvular heart disease in less developed countries. In the current era, these countries are facing an unsupported epidemiological transition that results in an outbreak of arterial hypertension and coronary artery disease responsible for a significant part of the etiologies of HF [4]. In Mali, in a study carried out at the University Hospital in Luxembourg in 2019, ischemic heart disease accounted for sixty-five percent of the causes found [7]. At the Point-G University Hospital in 2023, among young subjects, peripartum cardiomyopathy (PPCM) was the most prevalent with 27.1% [8]. In northern Mali, an area plagued by insecurity, terrorism and poverty, epidemiological data on HF are scarce. We have observed a significant proportion of hospitalizations of this pathology, which remains the final outcome of all cardiovascular pathologies, hence the present study with the objective of studying the epidemiological, clinical and therapeutic aspects of HF evolution in the medical department at the regional hospital of Gao.

Heart failure is a major public health pandemic due to its prevalence and severity in terms of morbidity and mortality and its financial impact in terms of costs. Its incidence and prevalence are increasing due to the aging of the population [1]. Worldwide, its prevalence is estimated at more than 26 million people, of whom 17% to 45% die within a year [2]. Despite the many advances in drug and non-drug therapy [3]. Particularly in developing countries, in proportion to the improvement in the socio-economic conditions of the populations [5]. Most of the African data comes mainly from hospital statistics, especially in French-speaking Africa [6]. The causes of this heart failure are multiple, in the 1990s they were dominated by rheumatic valvular heart disease in less developed countries. In the current era, these countries are facing an unsupported epidemiological transition that results in an outbreak of arterial hypertension (hypertension) and coronary artery disease responsible for a

significant part of the etiologies of HF [4]. In Mali, particularly in the north of the country, an area plagued by insecurity, terrorism for a decade and poverty, epidemiological data on HF are scarce. We have seen a significant proportion of our hospitalizations in the medical department of this pathology, which remains the final outcome of all cardiovascular pathologies. Based on this observation, the present study was initiated with the objective of studying the epidemiological, clinical and therapeutic aspects of HF evolution in the medical department at the regional hospital of Gao.

## 2. Patients and Methods

**Type and period of study:** This was a cross-sectional, descriptive study that ran from July 2022 to June 2023.

**Study location:** This study was carried out in the medical department at the Gao Regional Hospital in Mali.

**Study population:** All patients hospitalized in the ward during the study period, in whom the diagnosis of heart failure was confirmed on a clinical, radiographic, and electrocardiographic basis and confirmed by Doppler echocardiography.

**Sampling:** We did not sample this study, we were interested in all patients hospitalized during the study period.

**Inclusion criteria:** All patients of both sexes and of all ages greater than or equal to 15 years, hospitalized with the exception of children in the ward were included in this study. Thus, according to the hospitalization register of our medical department, a total of 324 patients were admitted for all pathologies combined during the study period, 143 files were retained responding to the diagnosis of heart failure.

**Non-inclusion criteria:** Were not included: -patients with heart failure but not hospitalized.

-patients hospitalized in the medical department for non-cardiovascular pathologies.

-medical records that do not contain the necessary elements to make a precise diagnosis.

**Variables studied:** Sociodemographic data were age, sex and occupation), cardiovascular risk factors (hypertension, diabetes, tobacco consumption, obesity, sedentary lifestyle), the diagnosis chosen (frequency, clinic and additional tests), the evolution of the disease during hospitalization (in-hospital mortality).

**Definition of heart failure:** Heart failure is therefore defined as the inability of the heart muscle to provide normal systemic blood flow, despite normal and/or high filling pressures [2].

**Signs of heart failure:** Dyspnea (according to NYHA), cough, crackling, proto-diastolic gallop sound for left heart failure. The one on the right was characterized by hepatalgia, the sound of the right gallop, hepatomegaly, edema

of the lower limbs, turgidity of the jugular veins. Other non-specific signs were asthenia [2].

**LVEF classification of heart failure** (European Society of Cardiology 2023 guideline) [9]:

- Preserved LVEF HF: is defined as a LVEF HF  $\geq 50\%$ ;
- Moderately reduced LVEF HF: Is an LVEF HF between 41% and 49%;
- Low LVEF HF: is a LVEF HF  $\leq 40\%$ .

**Etiologies of heart failure:** The causes of HF were determined by taking into account clinical and paraclinical parameters. Thus, the diagnosis of hypertensive heart disease was retained in the presence of HF occurring in a known hypertensive patient or on long-term antihypertensive therapy and associated with LV hypertrophy.

Ischemic heart disease was diagnosed with HF in a patient with chronic angina and/or acute chest pain with electrocardiogram impairment of pejorative repolarization and/or necrosis Q wave disorders and/or cardiac Doppler ultrasound akinesia or segmental hypokinesia.

Peripartum cardiomyopathy was considered for HF developed in the last month of pregnancy or in the first 5 months postpartum in the absence of another identifiable cause of HF.

Organic valvular heart disease was considered when HF was associated with an organic murmur and a morphological valve abnormality on cardiac Doppler ultrasound. Cardiothyreosis was reported when HF was associated with clinical signs of thyrotoxicosis and elevated FT4 L and/or decreased ultra-sensitive TSH levels. Chronic pulmonary heart disease was held in front of a right HF in a patient with chronic obstructive pulmonary disease or a history of pulmonary embolism associated with evidence of right cavitory overload and dilation.

Primary dilated cardiomyopathy (DMC) was considered when HF was associated with dilation with impaired systolic function of the left ventricle (and/or right ventricle) characterized by LVEF  $< 50\%$ .

Rhythmic cardiomyopathy was considered in the presence of HF related to rapid supraventricular arrhythmia, the reduction of which allowed recovery of LV systolic function [10].

**Data entry and analysis:** Patient data was collected on survey sheets and then inserted and analysed by SPSS 25. The Chi2 test and Pearson's t were used for the linkage search between variables. The materiality level has been set at 5%.

**Ethical Considerations:** Data confidentiality was respected throughout the study. The retrospective nature of our study did not allow us to have informed consent from our patients.

### 3. Results

This study involved 143 patients hospitalized for heart failure out of the 324 patients admitted to our medical department with a hospital prevalence of 44.1%. The average age was  $47.30 \pm 20$  years with extremes 16 - 88 years. The most common age group was 60 years old or higher, with 40% (Table 1). The

sex ratio was 1.38 in favour of women. Hypertension was the main history and concerned sixty-eight of our patients 47.6%. Among cardiovascular risk factors, hypertension was the most common in 66 of our hospitalized patients at 46.1%, followed by age, sedentary lifestyle and smoking with 27.2%, 18.2% and 7.9% respectively. Diabetes was reported in 8.3% (**Table 2**). The main symptoms were dyspnea (128 patients), lower limb edema (112 patients), cough (97 patients) and chest pain (7 patients) (89.5%, 78.3%, 67.8% and 4.9% respectively) (**Table 3**). According to the NYHA classification, 56 of our patients were stage IV and 64 patients were stage III with 39.1% and 44.8% respectively. Only 23 patients were at stage II, or 16.1%. On physical examination, one hundred and thirty-two patients had overall HF, 6 cases of left HF and 5 cases of right HF with successively 92.3%, 4.2% and 3.5% (**Table 3**). Cardiomegaly has been objectified in 98% of our patients. The electrocardiogram abnormalities found were: sinus tachycardia (40 patients) 28%, ventricular extrasystoles (12 cases) 8.4%, supraventricular extrasystoles (7 cases) 4.9%, atrial fibrillation (6 cases) 4.1%, junctional tachycardia (2 cases) 1.4%, left ventricular hypertrophy (37 cases) 25.9%, left atrial hypertrophy (11 cases) 7.7%, non-specific repolarization disorders (39 cases) 27.2%. Conduction disorders were: complete straight bundle branch blocks (8 cases) 5.6%. Left bundle branch blocks (3 cases) 2.1%, complete atrioventricular block (1 case) 0.7%. QS aspects in anteroseptal (7 patients) 4.9%. On transthoracic ultrasound, the mean diameter of LV in diastole was  $60.2 \pm 7$  mm, the mean LVEF was  $37.1\% \pm 13\%$ . LV was dilated in 130 of our patients (90.9%), left atrial dilated in 74 patients (51.7%). The right heart chambers were dilated in 43.3%, or in 62 patients. LV filling pressures were high at 39.2%. Pulmonary arterial hypertension was present in 47.6% (68 patients). The presence of intra-LV thrombus in six of our patients with 4.2%. Reduced EF HF in 110 patients (76.9%), moderately reduced EF HF (17 patients) (11.9%). Preserved EF HF was in 16 of our patients or 11.2%. During this study, the cardiovascular pathologies found were dominated by hypertensive heart disease, diagnosed in 46 patients (32.2%), followed by PPCM in 43 patients with 30.1%, primary DMC in 18 patients (12.6%), and ischemic heart disease diagnosed in 16 patients with 11.2%. Seven cases of valvular heart disease (4.9%), including one case of rheumatic mitro-aortic insufficiency, two cases of mitral insufficiency due to prolapse of the great mitral valve and three cases of aortic insufficiency due to sigmoid prolapse (**Table 4**). Pulmonary embolism at the right stage of heart failure was observed in four patients (2.8%). Rhythmic cardiomyopathy was found in three of our patients with 2.1%. Cardiothyreosis, on the other hand, was diagnosed in two patients, or 1.4%. Chronic pulmonary heart and pericarditis were collected in two and one case, respectively, at 1.4% and 0.7%. In the end, one case of complete atrioventricular block in heart failure was found with 0.7% (**Table 4**). By gender, PPCM was the most common in women, followed by hypertensive heart disease and primary DMC with 51.8%, 21.7% and 9.6% respectively. The most common cardiovascular diseases in men were dominated by hypertensive heart disease, followed by ischemic heart disease and

primary DMC with 46.7%, 20% and 16.7% respectively (**Table 4**). This difference by sex was statistically significant ( $p: 0.000$ ). In this series, the main drugs used were loop diuretics in all our patients (100%), followed by ACE inhibitors in 130 patients (90.9%), beta-blockers in 102 cases (71.3%), anti-mineralocorticoids in 86 of our patients (62.2%), antiplatelet agents in 100 patients (69.9%), potassium supplementation in 89 cases (62.2%), curative dose anticoagulants in 26 of our patients (16.8%), digitalis in 18 cases (12.6%), statins in 14 patients (9.8%) and nitrates in one patient (0.7%). Positive inotropes were used very little due to their unavailability.

The length of hospital stay was  $8.46 \pm 4.78$  days. The course of this retrospective study was favorable under treatment in 104 patients (72.7%).

In-hospital mortality occurred in 21 patients, or 14.7%. The heart disease cause of death was valvular heart disease with 5 deaths (71.4%), chronic pulmonary heart disease with one case out of two (50%), six cases of primary DMC (33.3%) and hypertensive heart disease with 8 cases (17.3%) (**Table 5**). Among the causes of death in our heart failure patients, cardiopulmonary arrest was the most common cause with 12 cases, or 57.1%, followed by 5 cases of cardiogenic shock (23.8%), two cases of rapid atrial fibrillation (9.5%) and two cases of thromboembolic disease (9.5%). Re-hospitalization was required for deviation in diet and treatment in 21 patients, or 14.7%. Hypertensive heart disease in terms of case fatality recorded the highest number of deaths with 5.6%. The age group  $\geq 60$  years was the deadlock with the highest number of deaths with an average age of 50.29 years of the patients who died.

**Table 1.** Distribution by sex, age group and locality.

Variable	Number	%
<b>Sex</b>		
<b>Women</b>	<b>83</b>	<b>52</b>
Male	60	40
<b>Age (year)</b>		
<b>Mean age = 47, <math>30 \pm 20</math> years with extremes 16 - 88 years</b>		
< 20 years	9	6.2
20 - 29 years	28	19.6
30 - 39 years	25	17.48
40 - 49 years	10	7
50 - 59 years	14	9.8
<b><math>\geq 60</math> years</b>	<b>57</b>	<b>40</b>
<b>Residence</b>		
<b>Urban</b>	<b>75</b>	<b>52.4</b>
Rural	68	47.6

**Table 2.** Distribution by cardiovascular risk factors.

Cardiovascular Risk Factors	Number	%
<b>High blood pressure</b>	<b>66</b>	<b>46.1</b>
Active smoking	11	7.7
Type II diabetes	12	8.39
Sedentary lifestyle	26	18.2
Age	39	27.2

**Table 3.** Distribution by reasons for admission, NYHA classification, and type of heart failure.

Reasons for Admission	Number N = 143	%
<b>Dyspnea</b>	<b>128</b>	<b>89.5</b>
Edema of the lower limbs	112	78.3
Cough	97	67.8
Palpitations	10	7
Anasarca	10	7
Hémoptysis	6	4,1
Chest pain	7	4.9
<b>NYHA Classification</b>		
NYHA Class I	0	0
NYHA Class II	23	16.1
<b>NYHA Class III</b>	<b>64</b>	<b>44.8</b>
NYHA Class IV	56	39.1
<b>Physical Examination</b>		
<b>Global Heart Failure Syndrome</b>	<b>132</b>	<b>92.3</b>
Left Heart Failure Syndrome	6	4.2
Right Heart Failure Syndrom	5	3.5

**Table 4.** Distribution by lesional diagnosis of heart failure and by sex.

Lesional diagnoses of heart failure	Sex			Statistical text
	Woman	Man	Total (%)	
<b>Hypertensive heart disease</b>	<b>18</b>	<b>28</b>	<b>46 (32.2)</b>	P: 0.000 Kh2: 59.832
Postpartum cardiomyopathy	43	0	43 (30.1)	
Primitive dilated cardiomyopathy	8	10	18 (12.6)	

**Continued**

Ischemic heart disease	<b>4</b>	<b>12</b>	<b>16 (11.2)</b>	
Valvular heart disease	5	2	7 (4.9)	
Pulmonary embolism	2	2	4 (2.8)	
Rhythmic cardiomyopathy	0	3	3 (2.09)	
Chronic Pulmonary Heart	1	1	2 (1.4)	<b>P: 0.000</b> <b>Kh2: 59.83</b>
Cardiomyopathy	2	0	2 (1.4)	
Pericarditis	0	1	1 (0.7)	
Complete atrioventricular dissociation	0	1	1 (0.7)	
<b>Total</b>	<b>83 (58)</b>	<b>60 (42)</b>	<b>143 (100)</b>	

**Table 5.** Distribution of heart failure causes by number of deaths.

<b>(a)</b>				
<b>Number of deaths by cause of heart failure</b>				
<b>Etiologies of heart failure</b>	<b>Number</b>	<b>Number of deaths by pathology N = 21 (%)</b>	<b>Overall number of deaths N = 143 (%)</b>	<b>Statistical test</b>
Hypertensive heart disease	46	8 (17.3)	<b>5.6%</b>	
Postpartum cardiomyopathy	43	3 (7)	2.1%	
Primitive dilated cardiomyopathy	18	6 (33.3)	4.2%	<b>P: 0.514</b> <b>Kh2: 6.159</b>
<b>Valvular heart disease</b>	<b>7</b>	<b>5 (71.4)</b>	3.4%	
Chronic Pulmonary Heart	2	1(50)	0,7%	

  

<b>(b)</b>			
<b>Age group</b>	<b>Number</b>	<b>Number of deaths by age group N = 21 (%)</b>	<b>Deaths rate by age group (%)</b>
<20 years	9 (6.2)	0	0
20 - 29 years	28 (19.6)	5 (23.8)	17.9
30 - 39 years	25 (17.4)	1 (4.8)	4
40 - 49 years	10 (7)	4 (19)	<b>40</b>
50 - 59 years	14 (9.8)	2 (9.5)	14.2
<b>≥60 years</b>	<b>57 (40)</b>	<b>9 (42.9)</b>	15.8

**4. Discussion**

The prevalence of HF in our medical department was 44.1% of our hospitalizations. This frequency was lower than those found in Congo Brazzaville and Gabon with



45.9% and 49.9% respectively [3] [11]. Other prevalences lower than that have been collected such as in Mauritania (33%), Togo (25.6%) and finally Senegal (14.28%) [4] [12] [13]. This difference in prevalence could be explained by the study sites, but also by the study period. Ours was conducted over twelve months. In a health structure, it remains the epicenter in the care of all regional referrals, unlike other university hospitals in the capital where there is a certain deconcentration in terms of accessibility and optimal care.

In this series, our patients were relatively young with a mean age of  $47.30 \pm 20$  years. The same is true of Tombouctou and Kati [5] [14]. Several African studies reported average ages between 54 - 70 years [7] [11] [15] [16]. The relatively young age of our patients could be related to the high frequency of postpartum cardiomyopathy in our study. In addition, the increase in cardiovascular risk factors, especially modifiable in tropical countries [15]. Global HF with NYHA stage III-V dyspnea was the most common clinical presentation in this study, with several authors reoccurring this usual clinical expression of HF during their observation [11] [15] [17]. This shows that patients have been seen at very advanced stages of their heart failure. Among the causes of these delays, we can retain : the lack of an adequate evacuation system, insecurity and poverty, but also, the poor upstream care of the authorized structures [18]. The role of traditional therapists plays a significant role, an observation also made by some authors [4]. The main etiologies were dominated by hypertensive heart disease, this etiology was widely found in several [3] [4] [11] [13] [14]. The THESUS-HF study carried out in nine sub-Saharan countries also highlighted the supremacy of hypertensive heart disease in our countries [19]. In contrast to some studies conducted in Africa, such as Morocco and Djibouti, in which ischemic heart disease was the main etiology identified [16] [19] [20]. This hegemony in favor of complications of hypertension proves that this disease remains the leading cardiovascular risk factor in the world, especially in our least developed countries.

The lack of knowledge of this disease in our societies with a low socio-economic level, its impact in terms of morbidity and mortality is underestimated by the population and the diagnosis is only made at the complicative phase of the disease [6].

The PPCM was in second place in this observational study. The same observation was also reported in Tombouctou by Traoré *et al* [14]. This shows that this pathology occupies a larger share in the etiologies of heart failure in sub-Saharan Africa, in black women with an unfavourable socio-economic level, as attested by Paule *et al* [6]. Primary DMC was the third most common with 12.6% of our HF hospitalizations. Kheyi *et al* found a prevalence of 16.27% and ranked second in their observation [16]. Other prevalences have been reported ranging from 7.6% to 22% [3] [11] [18]. In the literature, this nosological group accounts for 17 to 48% of the causes of admission for HF according to the African series [6]. In the multicenter THESUS HF study, primary DMC was collected in 18.8% and ranked second only to hypertension [2]. Also in Asia, particularly in China, it was ranked third according to the INTER-CHF study

[2]. The primitive nature of this pathology is sometimes difficult, which requires the elimination of any possible cause of dilated heart disease. For this, coronary angiography and possibly an endomyocardial biopsy are recommended [6]. These invasive examinations are not widely available in many African countries [6]. In Europe, Bolli in 2023 in Geneva, collected a prevalence of 4% in favor of DMC of undetermined cause in patients admitted for acute heart failure decompensated according to the Acute Heart Failure Registry of the University Hospitals of Geneva (UHG) [22]. This disparity between the data could be explained by the limitation of the technical platform for better exploration in the face of all cases of dilated cardiomyopathy in most developing countries.

Ischemic heart disease was less common in this study at 16.2%. This frequency was higher than that found in the THESUS-HF study, which provided 7.7% [19]. Contrary to the data, some African countries such as Morocco in 2015 and Djibouti in 2013, which reported a prevalence dominated by ischemic heart disease with 59.91% and 62% respectively [21] [23]. The same is true in developed countries, such as Europe, America and Asia, where ischemic heart disease remains the most prevalent. Thus, Bolli in 2023 in Geneva found 24% in favor of ischemic heart disease [22]. In China in the INTER-CHF study, heart disease was the leading cause of HF with 48%, followed by hypertensive heart disease. It is probably underestimated in our regions due to the narrowness of the technical platform, particularly the absence of coronary angiography rooms [2].

Valvular heart disease was collected in only 4.9% of our study population, making it the fourth leading cause of HF. The same frequency was reported by Balaka with 4.45%, but these frequencies are lower than those of Boutaqa and Pio who successively found 12.74% and 11.8% [13] [20] [23]. These data confirm the decline in the incidence of valvular heart disease, particularly rheumatic valvular heart disease, in our less developed countries, contrary to the data three decades ago when they were widespread [13] [20] [24]. The improvement in the accessibility of health facilities for the population could explain this decrease in the incidence of rheumatic heart disease. Also, the causes of heart failure can vary from one area of Africa to another according to the African THEUS-HF survey [4]. In advanced countries, the mechanism of valvular heart disease remains dominated by the dystrophic or degenerative aspect, unlike in underdeveloped countries, it is often rheumatic disorders that occur during childhood with a poor prognosis in the absence of cardiac surgery or interventional cardiology [16]. In this series, as in several African studies, the main drugs used were loop diuretics in all our patients (100%), followed by ACE inhibitors (90.9%), beta-blockers (71.3%), anti-mineralocorticoids (62.2%) and digitalis (12.6%) [5] [12] [23]. The use of loop diuretics in all our patients can be explained by the advanced clinical stage of our patients, most of whom are seen at stage III-IV of NYHA, as attested by Doumbia *et al* [5]. Several American and European studies, in particular, have shown that recommendations on the management of HF are very little applied, especially in our less developed

countries [16]. The accessibility and costs of care in the absence of social security coverage in our countries are obstacles to better patient care. The hospital prevalence of HF in our medical department was 14.7%. This rate is higher than those reported by several studies such as in Libreville (10.3%) and Rabat (6.1%) [3] [23]. Our rate was lower than that collected in Brazzaville (20.2%) among elderly people with an estimated average age of 70.4 years [11]. This difference in frequency could take place, on the one hand, by the fact that ours was carried out in a medical structure without a cardiology intensive care unit, let alone a cardiac catheterization room, like the studies carried out at the University Hospitals of Libreville and Rabat. On the other hand, this study was carried out in a war zone, where insecurity and terrorism have been rampant for several years, making medical evacuation and access to the necessary medicines almost impossible. In this case, the one carried out in Brazzaville focused on subjects older than ours. In France, despite therapeutic advances, intra-hospital mortality remains high at around 6.4% to reach 4.4% within 30 days after hospitalization [2]. The deadliest cardiovascular diseases were dominated by valvular heart disease, 71.4% of which required medical evacuation for surgical management. But unfortunately, due to a lack of financial resources and the inadequacy of our technical platform, none of them have been able to benefit from adequate care. Hypertensive heart disease in terms of case fatality recorded the highest number of deaths with 5.6%. This finding is similar to that of Damorou, who reported 5.9% of deaths in favor of hypertensive disease. This similarity could be related to the predominance of high blood pressure and its complications in both studies. The age group  $\geq 60$  years recorded the highest number of deaths. The same observation was made by Damorou, who had collected a greater number of deaths in patients over 60 years of age and/or older [24].

**Limitations of this study:** The small size of our study population, which is partly due to poor archiving of medical records, also many medical records were not rolled up due to lack of basic data to arrive at diagnoses. Some cardiovascular risk factors such as obesity and dyslipidemia were not assessed due to data errors. The diagnosis of certain diseases could not be carried out due to the under-equipping of our health facilities.

## 5. Conclusion

Heart failure is a common condition in sub-Saharan Africa, particularly in our country. The majority of patients were seen at an advanced stage of their disease with a very young population. Hypertensive heart disease, peripartum cardiomyopathy, primary dilated cardiomyopathy, and ischemic heart disease were the main etiologies collected with a considerable mortality rate. Reducing this morbidity and mortality requires an improvement in the technical platform of our health facilities. The identification of cardiovascular risk factors in both primary and secondary prevention and the education of the population in our low- and middle-income regions are more than essential.

## Conflicts of Interest

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

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