

# 100 Cases of Clinical and Etiological Aspects of Cardiac Insufficiency in N'Djamena, Chad

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## Abstract

**Introduction:** Cardiac Insufficiency is progressively taking over as the leading cause of morbidity and mortality in the world and a major public health problem in Chad. Our study was to contribute and provide a deeper understanding of the clinical and etiological aspects concerning the etiology and management of Cardiac Insufficiency in N'Djamena, Chad. Due to having no published data to distinctly understand this pathology in this part of the world, we represent here a summary of available data which could be used to describe the clinical and etiological aspects of Cardiac Insufficiency and to help in changing practices for an optimal management as a baseline for comparison in future studies. **Patients and Methods:** This was a prospective, descriptive study conducted from November 30th 2011 to May 30th 2013 at the Good Samaritan Hospital of N'Djamena. **Results:** 100 hospitalized patients were included consecutively. The sex ratio was 1.08 with an average age of  $40.21 \pm 21.30$  years. The main cardiovascular risk factors were high blood pressure (15%), obesity (12%) and diabetes (11%). Clinically, exertional dyspnea was found in 95% of cases, and signs of congestive heart failure in 61% of cases. The etiologies were 50% of Rheumatic valvulopathy, 22% of Dilated cardiomyopathy, 13% of Hypertensive cardiomyopathy and 12% of Congenital heart disease. **Conclusion:** The most common etiologies were Rheumatic valvulopathy, Congenital heart disease, Dilated cardiomyopathy and Hypertensive cardiomyopathy.

## Keywords

Cardiac Insufficiency, Etiology, Echocardiography, N'Djamena, Chad

## 1. Introduction

Cardiac Insufficiency (CI) is a common pathology worldwide. It is a clinical syndrome characterized by chronic symptoms (e.g. dyspnea, fatigue) that may be accompanied by physical signs (e.g. crepitations, peripheral edema) caused by a structural and/or functional cardiac abnormality, which causes a decrease in cardiac output [1]. CI is a major global public health problem affecting 40 million people worldwide in 2015 [2]. CI represents one of the leading causes of hospitalization, morbidity and mortality, especially among the elderly [3]. In western countries, the incidence and prevalence of CI are increasing due to the aging of the population [1]. The prevalence was estimated at 1% - 2% of the adult population [1] [4], while the incidence rate is generally estimated at 2 to 5 per 1000 people annually [5] [6]. In Africa, CI is one of the main circumstances in the discovery of cardiovascular disease with an incidence of 1 to 3 per 1000 people annually and a prevalence of 3 to 20 per 1000 people annually, often at an advanced stage [7]. According to World Health Organization estimates, cardiovascular disease is the second leading cause of death in Africa. In 2015, nearly 1.2 million people died of heart disease in Africa, which is more than Malaria and Tuberculosis combined [8]. Despite improvements observed in the survival of patients with CI in recent years, overall prognosis remains poor [3] [9] with 50% survival estimates at 5 years after initial CI diagnosis [10] [11]. However, in Chad, we do not have data on this pathology. The objective of this work was to identify the etiology of CI in Chad.

## 2. Patients and Methods

This was a study conducted from November 30th 2011 to May 30th 2013 at the Good Samaritan Hospital of N'Djamena. We consecutively included all the patients that were hospitalized for CI during this study period. Patients who refused to give their consent were excluded. There were no specific selection criteria. The variable studies were clinical (history, cardiovascular risk factors, functional signs, physical signs), biological (HIV serology, blood count, thyroid hormone, serum creatinine, blood urea, electrolyte panel, blood glucose) and echocardiographic (dilation, hypertrophy and left ventricular ejection fraction, valvular abnormalities, pulmonary arterial pressures, and pericardial abnormalities).

The system used was the HP 1000 ET 5500 model. The following parameters were specified:

- Dilation of the Left Ventricle
- Left Ventricular Hypertrophy
- Systolic Dysfunction
- Valvulopathy
- Congenital Heart Disease

### Statistical analysis

In this study, a descriptive statistical analysis was applied using Microsoft Excel, quantitative variables were presented by their mean and standard deviation

and qualitative variables were by percentages.

#### Declaration of ethics

The study was conducted after an agreement of the Ethics Committee of the Faculty of Medicine of N'Djamena and with the consent of patients.

### 3. Results

100 patients were included. **Table 1** summarizes the characteristics of this population. The sex ratio was 1.08 (52 men) with an average age of  $40.21 \pm 21.30$  years with a predominance of patients aged 20 to 29 years and those with an age greater than or equal to 50 years of age. The main cardiovascular risk factors were high blood pressure (15%), obesity (12%) and diabetes (11%). Other risk factors identified were dyslipidemia (02%), alcohol (10%), smoking (04%), and renal dysfunction (09%).

Clinically (**Table 2**), exertional dyspnea was observed in 95% of cases, and the signs of global CI were 61% of cases.

**Table 1.** Characteristics of the population.

Settings	Number (N)	Percentage (%)
Sex:		
Women	48	48
Man	52	52
Age (year):		
Means	$40.21 \pm 21.30$	
<20	24	24
20 - 29	27	27
30 - 39	10	10
40 - 49	12	12
≥50	27	27
Risk factors:		
Obesity	12	12
Diabetes	11	11
Dyslipidemia	02	02
Alcohol	10	10
Smoking	04	04
Hypertension	15	15
Renal Dysfunction	09	09

**Table 2.** Clinical manifestations.

	Number (N)	Percentage (%)
Functional signs:		
Dyspnea	95	95
Orthopnea	15	15
Hemoptysis	18	18
Palpitations	53	53
Hepatalgia	15	15
Physical signs:		
Left CI signs	29	29
Right CI signs	10	10
Signs of global CI	61	61

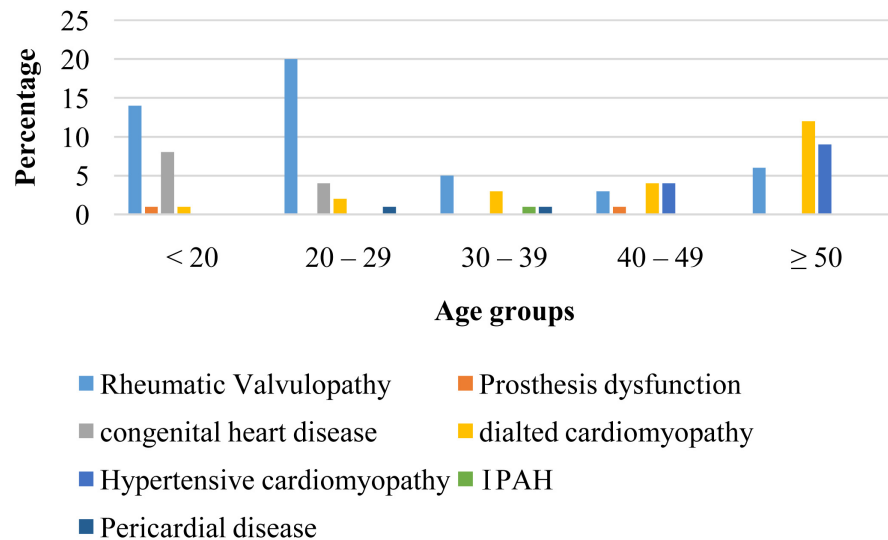
Regarding the etiologies of CI (**Table 3**), Rheumatic heart valve disease was found in 48% of cases including (11%) Mitral stenosis, (13%) Mitral insufficiency, (06%) Mitral diseases, (3%) Aortic stenosis, (2%) Aortic insufficiency, (4%) Aortic disease, and (9%) Polyvalvulopathy. The dysfunctions of the prosthetic valves were found in (2%) of cases all in the mitral position, which were mechanical and bioprosthetic. 22% of Dilated cardiomyopathies (DCM) including (8%) primary DCM, (4%) Ischemic DCM, (5%) Peripartum DCM, (3%) Ethyl DCM, (1%) Cardiothorosis DCM and (1%) Rhythmic DCM. Hypertensive cardiomyopathies were found in 13% of cases, 12% congenital heart disease, 2% pericardial disease, and 1% idiopathic pulmonary arterial hypertension (IPAH). **Table 3** presents the etiologies of CI by age group (**Figure 1**).

#### 4. Discussion

CI is a global public health problem. In Chad, we do not have epidemiological data on this pathology. In this study the mean age was  $40.21 \pm 21.30$  years and more than half of our patients were under 50 years of age. Several authors in Sub-Saharan Africa have found similar results [12] [13] [14]. In the West, according to the Framingham Cohort study, the average age was 70 [15]. This difference in the average age with the West, is related to the lack of medical coverage and the reduced life expectancy at home. The leading cardiovascular risk

**Table 3.** Etiologies of CI.

Etiology		Number (N)	Percentage (%)
	Mitral stenosis	11	11
	Mitral insufficiency	13	13
	Mitral disease	06	06
Rheumatic Valvulopathy	Aortic stenosis	03	03
	Aortic insufficiency	02	02
	Aortic disease	04	04
	Polyvalvulopathy	09	09
	Prosthesis Dysfunction	02	02
	Inter auricular communication	01	01
Congenital Heart Disease	Inter ventricular communication	04	04
	Atrio-ventricular canal	02	02
	Complex heart disease	05	05
	Ischemic	04	04
	Peripartum	05	05
Dilated Cardiomyopathy	Ethyl	03	03
	Cardiothyreosis	01	01
	Rhythmic	01	01
	Primitive	08	08
	Hypertensive Cardiomyopathy	13	13
	IPAH	01	01
	Pericardial Disease	02	02



**Figure 1.** Distribution of etiologies according to age groups.

factors in our study were high blood pressure, obesity, diabetes, alcohol and renal dysfunction. The same risk factors have been found in most studies in both developed and Sub-Saharan Africa [16] [17]. Our patients often presented with a global CI chart (61%) because of the delayed diagnosis related to difficulties in access to health care and the lack of specialists. This clinical presentation was noted by several authors in Sub-Saharan Africa [14] [18] [19]. The etiologies of CI in this study were dominated by non-ischemic causes. Rheumatic valvulopathy were the main causes (48%), followed by DCM (22%) and hypertensive cardiomyopathy (13%). Ischemic cardiomyopathy was found only in 4% of cases. These results are consistent with most of the study series in Sub-Saharan Africa, where these 3 etiologies account for more than 65% of the causes of CI [13] [14] [19] [20] [21]. In the West, Ischemic heart disease is the most common etiology of CI. However, in Africa, Hypertensive cardiomyopathy is predominant [16] [22]. In a recent systematic review and meta-analysis of 22 African studies (1999-2017) 10098 patients; Hypertensive heart disease was the most common cause of CI (39.2%), followed by Cardiomyopathy (21.4%) and Rheumatic heart disease (14.1%) [23]. Ischemic heart disease was rare (7.2%) [23]. The size of our sample was not representative to assert the rarity of ischemic heart disease in Ndjama, Chad. Further studies will be needed to provide an answer to this trend. However, according to age groups, our study revealed a clear predominance of Rheumatic heart disease and Congenital heart disease in children and young adults (<30 years of age). The dilated cardiomyopathies and the hypertensive heart diseases mainly affected adults beyond 30 years of age.

## 5. Limitations of Our Study

The sample size of our study is not significant enough to reach formal conclusions. In this study, we did not include the therapeutic and evolutionary aspect

of the patients which could have given us an idea about the overall care of the patients. Therefore, further studies are needed in the future with larger samples to better describe this pathology.

## 6. Conclusion

Cardiac Insufficiency is the main reason for hospitalization in the Cardiology Department at the Good Samaritan Hospital of N'Djamena in Chad. In this study, the four leading causes of CI were Rheumatic valvulopathy, congenital heart disease, dilated cardiomyopathy, and hypertensive cardiomyopathy. However, Ischemic heart disease was rare. In young people, the main etiology was rheumatic valvulopathy, whereas, in the elderly it was DCM.

## Conflicts of Interest

The authors do not declare any conflict of interest.

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### **Abbreviation**

CI: Cardiac Insufficiency; DCM: Dilated Cardiomyopathie; IPAH: Idiopathic Pulmonary Arterial Hypertension.