

Prognostic Factors in Patients with Chronic Heart Failure at the Maroua Regional Hospital, Cameroon

Jérôme Boombhi^{1, 2, *}, Liliane Mfeukeu-Kuaté¹, Honoré Kemnang¹, Rékia Mahamat¹,
Moustapha Seni³, Amalia Owona^{1, 2}, Pierre Mintom¹, Guillaume Ebene Manon¹, Alain Menanga^{1, 2}

¹Departement of Internal Medicine and Spécialities, Faculty of Medicine and Biomedicals Sciences, University of Yaoundé I, Yaoundé, Cameroon

²Cardiology Service, Yaoundé General Hospital, Yaoundé, Cameroon

³Internal Medicine Service, Maroua Regional Hospital, Maroua, Cameroon

Email address:

boombhijerome@yahoo.fr (Jérôme Boombhi)

*Corresponding author

To cite this article:

Jérôme Boombhi, Liliane Mfeukeu-Kuaté, Honoré Kemnang, Rékia Mahamat, Moustapha Seni, Amalia Owona, Pierre Mintom, Guillaume Ebene Manon, Alain Menanga. Prognostic Factors in Patients with Chronic Heart Failure at the Maroua Regional Hospital, Cameroon. *Cardiology and Cardiovascular Research*. Vol. 7, No. 4, 2023, pp. 88-92. doi: 10.11648/j.ccr.20230704.14

Received: September 27, 2023; **Accepted:** October 25, 2023; **Published:** November 17, 2023

Abstract: Introduction: Heart failure (HF) is a complex and serious condition that greatly impairs the quality of life of patients with high lethality. It is a major public health problem and is the leading cause of hospitalization for people over 60-65 years old. The therapeutic approach of HF has evolved considerably, allowing its prognosis to be improved. The aim of our study was to analyze the evolution of HF and to identify the predictive factors of mortality and re-hospitalization of patients with chronic heart failure at the Regional Hospital of Maroua. Methods: We carried out a prospective analytical study over a period of 8 months at the Maroua Regional Hospital (MRH). All patients followed in cardiology for chronic heart failure were included. Clinical and paraclinical data were collected on admission. The patients were followed for a period of 6 months and the primary study endpoint was the occurrence of cardiac death and/or re-hospitalization for heart failure. Results: The mean age of our patients was 54.5 ± 15.59 years with a male predominance. Arterial hypertension was the main etiology (58.2%) of heart failure. The re-hospitalization rate was 4.1% and the mortality rate was 3.7%. Multivariate analysis revealed three independent mortality factors: Dyspnea stage IV of the NYHA, LVEF<40%, and hemoglobin level less than 12g/dl. Stage IV dyspnea and left ventricular ejection fraction (LVEF) <40% were independent predictors of rehospitalization; Conclusion: In our context, the factors of poor prognosis in patients followed for chronic heart failure are impaired LVEF, NYHA stage IV dyspnea and anemia. In patients with these different factors, close and targeted care should be instituted to reduce morbidity and mortality.

Keywords: Chronic Heart Failure, Prognosis, Maroua

1. Introduction

Each year, cardiovascular diseases are the cause of 17.3 million deaths worldwide [1]. Heart failure, which represents the final outcome of the majority of these cardiovascular pathologies, contributes in a major way to the occurrence of these deaths [2]; Indeed, due to the growing aging of the population, its prevalence is constantly increasing: one person in 6 over the age of 65 presenting to the emergency department for dyspnea suffers from unrecognized heart failure [3–5]. It is a clinical syndrome characterized by

symptoms and signs secondary to a structural and/or functional cardiac abnormality, which results in decreased cardiac output and or high filling pressures at rest or during exercise [2]. Overall mortality from symptomatic heart failure is approximately 50% within 4 years of diagnosis and the mortality rate per year for patients with a heart failure flare can vary between 10-50% [6–8]. It has a considerable impact on the health system and the costs generated by its management are estimated at 2% of total health expenditure in Western countries [9, 10]. In Cameroon, a study by Boombhi and *al.* at the Yaoundé Central Hospital for a period of three years found

an intra-hospital mortality rate of 18.45% [11].

The evaluation of the prognosis is a fundamental step in the management of heart failure [12, 13]. The patients die in about half of the cases in a picture of progressive and terminal heart failure, refractory to medical treatment [12, 13]. Several studies have shown that initiating early treatment with knowledge of poor prognostic factors reduces mortality in hospitalized patients with decompensation [12–15]. The evaluation of its prognosis is therefore essential for adequate management; However, in Africa, more particularly in the North of Cameroon, scientific data are poor on this topic. We therefore decided to conduct a study on the prognostic factors of chronic heart failure at the regional hospital of Maroua.

2. Methods

2.1. Study Design and Setting

We carried out a prospective analytical study at the MRH over a period of 8 months (October 2021 to June 2022).

2.2. Participants

Patients were included in our study: any patient with a diagnosis of “Chronic heart failure” based on clinical signs and transthoracic Doppler echocardiography. Patients whose medical records had insufficient data were excluded.

2.3. Data Collection

Patients were selected from the cardiology departments of the MRH (outpatient consultation and cardiology hospitalization). In addition, the collection of data was also done in the files of old patients fulfilling the inclusion criteria which allowed us to take the telephone numbers of patients who did not have certain information for a re-evaluation and to complete certain data of the data sheet previously established. From each participant, after obtaining informed consent, we collect socio-demographic data (age and sex, marital status), the various cardiovascular risk factors, and other particular non-cardiovascular antecedents. In addition, we also collect clinical parameters (symptoms and physical signs of heart failure) as well as the various medications taken by patients. Finally, the paraclinical elements, in particular the electrocardiogram, the transthoracic Doppler echocardiography (TTDE) as well as the biological parameters were collected.

2.4. Statistical Analysis

All the data collected were analyzed using the software SPSS version 21.0. Quantitative variables were expressed in terms of means and standard deviations, while qualitative variables were expressed as counts and proportions. For the comparison of the proportions, the Chi-square test or exact Fisher probability was used. Quantitative variables were compared by Student's parametric test or Mann-Whit non-parametric test. The threshold of significance was set at 0.05.

3. Results

3.1. Characteristics of the Sample

Overall 196 participants were included in the study. Among them, 129 (65.8%) were males. Their mean age was 54 ± 15 years with a minimum of 18 years and a maximum of 90 years. The majority of our participants were married (80.6%) and 49% worked in the informal sector. The main modifiable cardiovascular risk factors present in our patients were arterial hypertension (39.8%) followed by diabetes (14.8%) and smoking (14.8%). Regarding the clinical characteristics, dyspnea was present in all our patients and the majority were at NYHA stage II (58.7%). Moreover, on physical examination, the most common sign was edema of the lower limbs (49.5%). Regarding the paraclinical elements, on the resting ECG, 177 patients (90.3%) were in sinus rhythm. At the TTDE, 62 patients (31.6%) had altered LVEF, and 49 patients (25%) had anemia. See table 1.

Table 1. Socio-demographical and clinical characteristics.

Variables	Frequency (N=196)	Percentage (%)
Age (in years)		
<40	73	37.2
[40-60]	101	51.5
>60	22	11.3
Sex		
female	67	34.2
male	129	65.8
Marital status		
Single	35	18
married	158	80
Widower/ divorce	3	02
occupation		
Formal sector	21	11
Informal sector	96	49
Unemployed	79	40
CVRF		
Hypertension	78	39.8
Diabetes	29	14.8
Tobacco	29	14.8
Dyspnea stages NYHA		
Stage I	8	4.1
Stage II	115	58.7
Stage III	68	34.7
Stage IV	5	2.5
Physical signs		
edema of the lower limbs	97	49.5
crackles	62	31.6
Heart murmur	33	17

3.2. Mortality and Short-Term Rehospitalization Rates

The rate of rehospitalization for decompensation within 6 months after discharge was 4.1% while the death rate was 3.6%. See table 2.

Table 2. Paraclinicals characteristics.

Variables	Frequency (N= 196)	Percentage (%)
Deceased patients	7	3.6
Re-hospitalization	8	4.1
after 0-1 month	0	0
after 2-3 month	4	2
after 4-6 month	4	2

3.3. Factors Associated With Re-Hospitalization and Mortality

The only factor associated with re-hospitalization in our setting was a LVEF less than 40% (see Table 3); while the factors associated with death were: the presence of anemia, NYHA stage 4, and an LVEF less than 40%. See table 4.

Table 3. Short-term mortality and re-hospitalization rates.

Variables	Frequency (N= 196)	Percentage (%)
ECG		
Sinus rhythm	177	90
Atrial fibrillation	19	10
LVEF		
Preserved	59	30.1
Mildly reduced	56	28.6
Reduced	62	31.6
Anemia	49	25

Table 4. Factors associated with rehospitalization.

	Re-hospitalization	No Re-hospitalization	P
NYHA Stage IV	2	3	0.09
LVEF ≤40%	5	57	0.03
Anemia	4	45	0.2

Table 5. Factors associated with death.

	Living patient	Deceased patients	Valeur P
Stage IV NYHA	1	4	0.00
LVEF <40%	56	6	0.004
Anemia	44	5	0.05

4. Discussion

Heart failure is a frequent pathology, representing the final outcome of the majority of cardiovascular diseases. The aim of our study was to research the different prognostic factors of this pathology which represents a major public health problem. In our series, the average age was 54 ± 15 years. Our patients were younger compared to caucasians series, but are comparable to the African series, in particular those of Kingue and *al.* [16]. This difference could be explained by the importance of hypertension in Africa, which is the main etiology of HF in our context, and whose diagnosis and management is very often delayed, hence the early development of complications [16–19]. Indeed, arterial hypertension multiplies by 3 the risk of developing HF [20, 21]; it was the most common factor found in our patients (58.2%). These data are the most comparable to the study in the sub-Saharan register (THESUS-HF) Damasceno et al. which reports hypertension as the first risk factor found with 55% of hypertensive patients [22]. In our series, 14% of patients had type 2 diabetes. This is indeed an important risk factor for the occurrence of heart failure either in relation to the occurrence of coronary heart disease, but also independently of the onset of coronary disease [23–25].

Symptoms attributable to heart failure are important prognostic indicators of the overall morbidity and mortality of the disease [7]; in our series, the majority of patients had

NYHA stage II dyspnea (58.7%) and 37.2% were in stage III-IV. Our results are similar to the European ESC-HF Registry which also reported a majority of patients with stage I-II dyspnea (74%) and only 26% with stage III-IV dyspnea [26]. These observations are justified by the fact that most of our patients were recruited in an outpatient setting and were therefore stable chronic heart failure patients.

Despite therapeutic progress, HF remains a serious disease, burdened with heavy mortality with a poor prognosis [27, 28]. In our study, hospital mortality was around 3.6%. This rate can be superimposed on that reported in several registers where it varies from 4% to 7% [29]. The ALARM-HF study reports higher hospital mortality (11%) [30, 31]. This higher mortality in this last series can be explained by the fact of the greater proportion of patients at stage 4 of NYHA and in cardiogenic shock. HF not only reduces life expectancy and quality of life, but it is also the cause of numerous and long hospitalizations [32, 33]. Hospitalizations, because of their frequency and duration, represent a significant part of the medical cost of heart failure [32, 33].

Studies on ultrasound prognostic factors, very frequent and generally concordant, highlight many major pejorative prognostic factors. The most efficient parameter remains the LVEF. Numerous studies have already confirmed the prognostic importance of an altered LVEF is globally associated with a poor prognosis [34–38]. In our series, anemia was a biological factor associated with increased mortality. This is similar to studies found in the literature [39–41]. This is mainly explained by cellular hypoxia caused by anemia [39–41].

5. Conclusion

Heart failure remains a pathology with a poor prognosis in our context. The factors associated with this poor prognosis are multiple, including an LVEF less than 40%, NYHA stage 4, and the presence of anemia. The control of these poor prognostic factors is necessary to reduce morbidity and mortality linked to HF.

Abbreviations

ECG: Electrocardiogram
 HF: Heart Failure
 LVEF: Left Ventricular Ejection Fraction
 MRH: Maroua Regional Hospital
 NYHA: New York Heart Association
 TTDE: Trans Thoracic Doppler Echocardiography

Declaration

Authors Contribution

Conception and design: JB, RM, AM.

Data Collection

Data analysis and interpretation: JB, RM, AM.
 Manuscript drafting: HK, JB, RM

Manuscript revision: JB, AM, LMK, MS, AO, PM, GEM
Approval of the final manuscript: All the authors.

Availability of Data and Materials

The datasets used for this study are available from the corresponding author on request.

Ethical Approval and Consent to Participate

The study was approved by the Institutional Ethical Review Board of the University Yaoundé I (Cameroon). All the participants read and signed an informed consent before their inclusion in the study.

Conflicts of Interest

The authors declare that they have no competing interests.

Acknowledgments

The authors would like to thank the staff of the cardiology unit of the Maroua Regional Hospital.

References

- [1] Cardiovascular diseases [Internet]. [cité 9 mai 2021]. Disponible sur: <https://www.who.int/westernpacific/health-topics/cardiovascular-diseases>
- [2] Pathophysiology of heart failure - PMC [Internet]. [cité 15 avr 2023]. Disponible sur: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7944197/>
- [3] Azad N, Lemay G. Management of chronic heart failure in the older population. *J Geriatr Cardiol JGC*. 2014; 11 (4): 329-37.
- [4] Roger VL. Epidemiology of Heart Failure. *Circ Res*. 14 mai 2021; 128 (10): 1421-34.
- [5] Díez-Villanueva P, Alfonso F. Heart failure in the elderly. *J Geriatr Cardiol JGC*. 2016; 13 (2): 115-7.
- [6] Bytyçi I, Bajraktari G. Mortality in heart failure patients. *Anatol J Cardiol*. 2015; 15 (1): 63-8.
- [7] Heart failure—concepts and significance. Birth of a prognostic model - PMC [Internet]. [cité 15 avr 2023]. Disponible sur: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3019070/>
- [8] Mortality and Cause of Death in Patients With Heart Failure: Findings at a Specialist Multidisciplinary Heart Failure Unit | Revista Española de Cardiología [Internet]. [cité 15 avr 2023]. Disponible sur: <https://www.revescardiol.org/en-mortality-cause-death-in-patients-articulo-13148598>
- [9] Hessel FP. Overview of the socio-economic consequences of heart failure. *Cardiovasc Diagn Ther*. 2021; 11 (1): 254-62.
- [10] Cost-of-illness studies in heart failure: a systematic review 2004–2016 - PMC [Internet]. [cité 15 avr 2023]. Disponible sur: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC5930493/>
- [11] Jéacute;rôme Boombhi M, Moampea M, Kuate L, Menanga A, et al. Clinical Pattern and Outcome of Acute Heart Failure at the Yaounde Central Hospital. *Open Access Libr J*. 2017; 4 (3): 1-8.
- [12] Jones NR, Hobbs FR, Taylor CJ. Prognosis following a diagnosis of heart failure and the role of primary care: a review of the literature. *BJGP Open*. 1 (3): bjgpopen17X101013.
- [13] Guidelines for the Evaluation and Management of Heart Failure | Circulation [Internet]. [cité 15 avr 2023]. Disponible sur: <https://www.ahajournals.org/doi/full/10.1161/01.CIR.92.9.2764>
- [14] Acute Decompensated Heart Failure - PMC [Internet]. [cité 15 avr 2023]. Disponible sur: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2801958/>
- [15] ‘Time is prognosis’ in heart failure: time-to-treatment initiation as a modifiable risk factor - PMC [Internet]. [cité 15 avr 2023]. Disponible sur: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC8712849/>
- [16] Kingue S. [A New Look at Adult Chronic Heart Failure in Africa in the Age of the Doppler Echocardiography: Experience of the Medicine Department at Yaounde General Hospital] - PubMed [Internet]. [cité 21 mai 2020]. Disponible sur: [annales de cardiologie et d'angéiologie](https://pubmed.ncbi.nlm.nih.gov/34411111/).
- [17] Gallagher J, McDonald K, Ledwidge M, Watson CJ. Heart Failure in Sub-Saharan Africa. *Card Fail Rev*. 2018; 4 (1): 21-4.
- [18] Ntusi NBA, Mayosi BM. Epidemiology of heart failure in sub-Saharan Africa. *Expert Rev Cardiovasc Ther*. 2009; 7 (2): 169-80.
- [19] Nyaga UF, Bigna JJ, Agbor VN, Essouma M, Ntusi NAB, Noubiap JJ. Data on the epidemiology of heart failure in Sub-Saharan Africa. *Data Brief*. 2018; 17: 1218-39.
- [20] Tackling G, Borhade MB. Hypertensive Heart Disease. In: *StatPearls* [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [cité 15 avr 2023]. Disponible sur: <http://www.ncbi.nlm.nih.gov/books/NBK539800/>
- [21] Drazner MH. The Progression of Hypertensive Heart Disease. *Circulation*. 2011; 123 (3): 327-34.
- [22] Damasceno A, Mayosi BM, Sani M, Ogah OS, Mondo C, Ojji D, et al. The causes, treatment, and outcome of acute heart failure in 1006 Africans from 9 countries. *Arch Intern Med*. 2012; 172 (18): 1386-94.
- [23] Diabetes and heart failure are linked; treatment should be too | American Heart Association [Internet]. [cité 15 avr 2023]. Disponible sur: <https://www.heart.org/en/news/2019/06/06/diabetes-and-heart-failure-are-linked-treatment-should-be-too>
- [24] Heart Failure in Type 2 Diabetes Mellitus | Circulation Research [Internet]. [cité 15 avr 2023]. Disponible sur: <https://www.ahajournals.org/doi/10.1161/CIRCRESAHA.118.311371>
- [25] Ceriello A, Catrinou D, Chandramouli C, Cosentino F, Dombrowsky AC, Itzhak B, et al. Heart failure in type 2 diabetes: current perspectives on screening, diagnosis and management. *Cardiovasc Diabetol*. 2021; 20 (1): 218.
- [26] Maggioni AP, Anker SD, Dahlström U, Filippatos G, Ponikowski P, Zannad F, et al. Are hospitalized or ambulatory patients with heart failure treated in accordance with European Society of Cardiology guidelines? Evidence from 12,440 patients of the ESC Heart Failure Long-Term Registry. *Eur J Heart Fail*. 2013; 15 (10): 1173-84.

- [27] Heart failure in the last year: progress and perspective - PMC [Internet]. [cité 15 avr 2023]. Disponible sur: <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7754751/>
- [28] Prognosis of Heart Failure - an overview | ScienceDirect Topics [Internet]. [cité 15 avr 2023]. Disponible sur: <https://www.sciencedirect.com/topics/medicine-and-dentistry/prognosis-of-heart-failure>
- [29] Adams KF, Fonarow GC, Emerman CL, LeJemtel TH, Costanzo MR, Abraham WT, et al. Characteristics and outcomes of patients hospitalized for heart failure in the United States: rationale, design, and preliminary observations from the first 100,000 cases in the Acute Decompensated Heart Failure National Registry (ADHERE). *Am Heart J.* 2005; 149 (2): 209-16.
- [30] Mebazaa A, Parissis J, Porcher R, Gayat E, Nikolaou M, Boas FV, et al. Short-term survival by treatment among patients hospitalized with acute heart failure: the global ALARM-HF registry using propensity scoring methods. *Intensive Care Med.* 2011; 37 (2): 290-301.
- [31] Follath F, Yilmaz MB, Delgado JF, Parissis JT, Porcher R, Gayat E, et al. Clinical presentation, management and outcomes in the Acute Heart Failure Global Survey of Standard Treatment (ALARM-HF). *Intensive Care Med.* 2011; 37 (4): 619-26.
- [32] Boulay F, Berthier F, Sisteron O, Gendreike Y, Gibelin P. Seasonal variation in chronic heart failure hospitalizations and mortality in France. *Circulation.* 1999; 100 (3): 280-6.
- [33] Stewart S, MacIntyre K, MacLeod MM, Bailey AE, Capewell S, McMurray JJ. Trends in hospitalization for heart failure in Scotland, 1990-1996. An epidemic that has reached its peak? *Eur Heart J.* 2001; 22 (3): 209-17.
- [34] Prognostic factors in the heart failure with reduced ejection fraction - International Journal of Cardiology [Internet]. [cité 15 avr 2023]. Disponible sur: [https://www.internationaljournalofcardiology.com/article/S0167-5273\(17\)30572-7/fulltext](https://www.internationaljournalofcardiology.com/article/S0167-5273(17)30572-7/fulltext)
- [35] Hajouli S, Ludhwani D. Heart Failure And Ejection Fraction. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2023 [cité 15 avr 2023]. Disponible sur: <http://www.ncbi.nlm.nih.gov/books/NBK553115/>
- [36] Frequency and Relevance of Thyroid Dysfunction in Patients with Chronic Heart Failure: A Cross Sectional Study at Yaoundé Central Hospital, Cameroon [Internet]. [cité 4 mai 2021]. Disponible sur: <https://www.fortunejournals.com/articles/frequency-and-relevance-of-thyroid-dysfunction-in-patients-with-chronic-heart-failure-a-cross-sectional-study-at-yaoundeacute-cent.html>
- [37] Ergatoudes C, Schaufelberger M, Andersson B, Pivodic A, Dahlström U, Fu M. Non-cardiac comorbidities and mortality in patients with heart failure with reduced vs. preserved ejection fraction: a study using the Swedish Heart Failure Registry. *Clin Res Cardiol.* 2019; 108 (9): 1025-33.
- [38] Yoshihisa A, Sato Y, Kanno Y, Takiguchi M, Yokokawa T, Abe S, et al. Prognostic impacts of changes in left ventricular ejection fraction in heart failure patients with preserved left ventricular ejection fraction. *Open Heart.* 2020; 7 (1): e001112.
- [39] Anemia and Its Relationship to Clinical Outcome in Heart Failure | Circulation [Internet]. [cité 15 avr 2023]. Disponible sur: <https://www.ahajournals.org/doi/10.1161/01.cir.0000134279.79571.73>
- [40] Alexandrakis MG, Tsirakis G. Anemia in Heart Failure Patients. *ISRN Hematol.* 25 mars 2012; 2012: 246915.
- [41] Groenveld HF, Januzzi JL, Damman K, van WJ, Hillege HL, van VDJ, et al. Anemia and Mortality in Heart Failure Patients. *J Am Coll Cardiol.* 2008; 52 (10): 818-27.