HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

TWENTY-YEAR COMPARATIVE ANALYSIS OF THE PREVALENCE, CLINICAL COURSE, AND PHARMACOLOGICAL TREATMENT OF CHRONIC HEART FAILURE: A LITERATURE REVIEW

Yuldasheva Feruza
Master Student in Cardiology,
Department of Faculty Therapy.
Andijan state medical institute

Introduction

Chronic heart failure (CHF) remains one of the leading causes of morbidity, mortality, and healthcare expenditures worldwide. Despite substantial advances in cardiovascular medicine, CHF continues to represent a major public health challenge due to the aging population, increasing prevalence of cardiovascular risk factors, and improved survival of patients with acute cardiovascular events. Over the past two decades, remarkable changes have occurred in the epidemiology, clinical presentation, diagnostic approaches, and pharmacological management of heart failure. Heart failure is a complex clinical syndrome characterized by the inability of the heart to provide adequate blood supply to meet the metabolic demands of the body. The syndrome results from structural and functional cardiac abnormalities that impair ventricular filling and/or ejection of blood. According to contemporary classifications, heart failure is categorized into heart failure with reduced ejection fraction (HFrEF), heart failure with mildly reduced ejection fraction (HFmrEF), heart failure with preserved ejection fraction (HFpEF), and heart failure with improved ejection fraction (HFimpEF). This classification reflects the heterogeneity of the disease and has important therapeutic implications.

Key words: Chronic heart failure, epidemiology; Risk factors; HFrEF; HFpEF; pharmacological therapy; SGLT2 inhibitors; Guideline-directed medical therapy (GDMT).

The global burden of CHF has increased steadily during the last twenty years. Population-based studies demonstrate that approximately 1–2% of the adult population in developed countries suffers from heart failure, while the prevalence exceeds 10% among individuals older than 70 years. The growing number of elderly individuals, combined with improved survival following myocardial infarction and other cardiovascular conditions, has contributed significantly to the increasing prevalence of CHF. Furthermore, the rising incidence of obesity, diabetes mellitus, hypertension, chronic kidney disease, and metabolic syndrome has accelerated the development of heart failure in many regions of the world. During the early 2000s, ischemic heart disease and uncontrolled hypertension were the predominant causes of CHF. Although these etiologies remain important, recent years have witnessed a growing contribution of metabolic disorders, atrial fibrillation, chronic kidney disease, and age-related cardiovascular changes. As a result, the profile of heart failure patients has become increasingly complex, characterized by multimorbidity and polypharmacy. This transformation has necessitated the development of individualized therapeutic approaches and multidisciplinary models of care.

Significant changes have also occurred in the clinical spectrum of CHF. Historically, HFrEF represented the dominant phenotype encountered in clinical practice. However, contemporary epidemiological studies indicate a progressive increase in the prevalence of HFpEF, particularly among elderly patients, women, and individuals with multiple comorbidities. Currently, HFpEF

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

accounts for approximately half of all heart failure cases in many developed countries. The increasing recognition of HFpEF has stimulated extensive research into its pathophysiology, diagnosis, and treatment strategies. Advances in pharmacological therapy represent one of the most important achievements in the management of CHF over the last two decades. In the early 2000s, standard treatment primarily consisted of angiotensin-converting enzyme inhibitors (ACE inhibitors), diuretics, digoxin, and, in selected cases, angiotensin receptor blockers (ARBs). Subsequently, large randomized clinical trials established the efficacy of beta-blockers and mineralocorticoid receptor antagonists (MRAs), leading to substantial reductions in mortality and hospitalization rates.The past decade has witnessed further therapeutic breakthroughs with the introduction of angiotensin receptor–neprilysin inhibitors (ARNIs) and sodium-glucose cotransporter-2 (SGLT2) inhibitors. Current international guidelines identify four foundational pharmacological classes for patients with HFrEF: renin–angiotensin system inhibitors (preferably ARNIs), beta-blockers, mineralocorticoid receptor antagonists, and SGLT2 inhibitors. These therapies have demonstrated significant benefits in reducing cardiovascular mortality, heart failure hospitalization, and disease progression.Additionally, growing evidence supports the role of SGLT2 inhibitors across the entire spectrum of heart failure phenotypes, including HFmrEF and HFpEF. These findings have transformed treatment paradigms and expanded therapeutic opportunities for patient populations previously lacking evidence-based interventions.Despite these advances, CHF continues to be associated with substantial mortality, recurrent hospitalizations, impaired quality of life, and significant economic burden. Therefore, understanding the long-term changes in disease prevalence, clinical characteristics, and therapeutic strategies is essential for evaluating the effectiveness of current healthcare interventions and identifying future directions for research and clinical practice.The aim of this literature review is to provide a comprehensive comparative analysis of the prevalence, clinical course, and pharmacological treatment of chronic heart failure over the past twenty years, highlighting major epidemiological trends, therapeutic developments, and ongoing challenges in the management of this complex syndrome.

Chronic heart failure (CHF) represents one of the fastest-growing cardiovascular syndromes worldwide and remains a major contributor to disability, hospitalization, and mortality. Over the last two decades, the epidemiological profile of CHF has undergone significant changes due to population aging, increasing prevalence of cardiovascular risk factors, and improvements in acute cardiovascular care. At the beginning of the 21st century, the prevalence of CHF in developed countries was estimated at approximately 1–2% of the adult population. However, among individuals older than 70 years, prevalence rates exceeded 10%, reflecting the strong association between aging and heart failure development. Improvements in the management of acute myocardial infarction, coronary artery disease, and hypertension have significantly reduced cardiovascular mortality, allowing more patients to survive long enough to develop chronic heart failure. The global burden of CHF has increased steadily over the last twenty years. This rise is largely attributable to demographic transitions and the growing incidence of noncommunicable diseases. Hypertension, diabetes mellitus, obesity, chronic kidney disease, metabolic syndrome, and atrial fibrillation have become increasingly prevalent and now contribute substantially to heart failure development. Consequently, CHF is no longer viewed solely as a consequence of ischemic heart disease but rather as a multifactorial syndrome resulting from complex interactions among cardiovascular, metabolic, renal, and systemic disorders. One of the most remarkable epidemiological trends observed during the past two decades is the increasing age of heart failure patients. In many countries, the median age of patients hospitalized with CHF has risen significantly. Elderly patients frequently present with multiple comorbidities, including diabetes mellitus, chronic kidney disease, chronic obstructive pulmonary disease, anemia, frailty, and cognitive

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

impairment. These conditions complicate clinical management and adversely affect prognosis. Gender-related differences in heart failure epidemiology have also become increasingly apparent. Men are more likely to develop heart failure with reduced ejection fraction (HFrEF), primarily as a consequence of ischemic heart disease and previous myocardial infarction. In contrast, women more frequently develop heart failure with preserved ejection fraction (HFpEF), often associated with hypertension, obesity, diabetes, and age-related myocardial remodeling. As life expectancy among women is generally longer than among men, the proportion of elderly female patients with CHF has increased substantially. Another important epidemiological shift concerns the changing distribution of heart failure phenotypes. During the early 2000s, HFrEF accounted for the majority of diagnosed cases. However, contemporary studies indicate a progressive increase in HFpEF prevalence. Currently, HFpEF represents approximately half of all heart failure cases in many developed healthcare systems. This trend reflects population aging and the growing prevalence of metabolic disorders and hypertension.

Hospitalization remains a major challenge in CHF management. Heart failure is one of the leading causes of hospital admission among older adults. Although advances in pharmacological therapy have reduced mortality rates, recurrent hospitalizations continue to contribute significantly to healthcare expenditures. Rehospitalization rates remain particularly high among elderly patients with multiple comorbidities and advanced disease stages. Mortality associated with CHF has improved considerably over the last twenty years due to earlier diagnosis, evidence-based pharmacological treatment, device therapy, and multidisciplinary management programs. Nevertheless, prognosis remains unfavorable compared with many other chronic diseases. Mortality risk increases substantially with disease progression, repeated hospitalizations, reduced left ventricular ejection fraction, renal dysfunction, and advanced age. Overall, the epidemiological evolution of chronic heart failure over the last twenty years demonstrates a transition from a predominantly ischemic and systolic disorder toward a more complex, multimorbid syndrome characterized by increasing prevalence, aging patient populations, and growing representation of HFpEF. These trends highlight the necessity for continuous adaptation of preventive strategies, diagnostic approaches, and therapeutic interventions aimed at reducing the global burden of CHF.The etiology of chronic heart failure (CHF) has undergone significant changes over the past two decades. Historically, ischemic heart disease and uncontrolled hypertension were considered the principal causes of heart failure. While these factors remain highly relevant, the increasing prevalence of metabolic disorders, population aging, and improved survival following acute cardiovascular events have altered the etiological landscape of CHF. Coronary artery disease continues to be the leading cause of heart failure in developed countries. Advances in reperfusion therapy, coronary interventions, and secondary prevention strategies have significantly improved survival rates following myocardial infarction. However, many survivors subsequently develop chronic ventricular dysfunction, contributing to the growing prevalence of CHF. As a result, the number of patients living with post-infarction heart failure has increased despite reductions in acute cardiovascular mortality. Arterial hypertension remains one of the most important modifiable risk factors for heart failure. Long-standing hypertension leads to left ventricular hypertrophy, myocardial fibrosis, impaired ventricular relaxation, and eventually heart failure. Improved detection and treatment of hypertension have reduced some of its adverse consequences; nevertheless, hypertension remains highly prevalent worldwide, particularly among older adults. The global epidemic of obesity has emerged as a major contributor to heart failure development. Excess adipose tissue promotes systemic inflammation, insulin resistance, endothelial dysfunction, and structural cardiac remodeling. Obesity is strongly associated with HFpEF and is increasingly recognized as an independent risk factor for cardiovascular morbidity and mortality. Furthermore,

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

obesity frequently coexists with hypertension, diabetes mellitus, and sleep-disordered breathing, creating a complex network of interacting risk factors. Diabetes mellitus has become one of the most significant contributors to heart failure over the last twenty years. Hyperglycemia, insulin resistance, microvascular dysfunction, oxidative stress, and myocardial fibrosis contribute to the development of diabetic cardiomyopathy. Numerous epidemiological studies have demonstrated that patients with diabetes have a substantially higher risk of developing CHF compared with the general population. Chronic kidney disease (CKD) has also gained importance as both a risk factor and a consequence of heart failure. The close relationship between cardiac and renal dysfunction is often described as the cardiorenal syndrome. Renal impairment contributes to fluid retention, neurohormonal activation, electrolyte abnormalities, and adverse cardiovascular outcomes. Simultaneously, reduced cardiac output can worsen renal function, creating a vicious cycle that accelerates disease progression. Atrial fibrillation has become increasingly common among patients with CHF. The coexistence of these conditions significantly increases morbidity and mortality. Atrial fibrillation impairs ventricular filling, reduces cardiac output, and promotes thromboembolic complications. Aging populations and improved survival of cardiovascular patients have contributed to the growing prevalence of this arrhythmia. Lifestyle factors remain critically important in the development of CHF. Physical inactivity, smoking, excessive alcohol consumption, unhealthy dietary habits, and psychosocial stress contribute to cardiovascular disease progression and increase the risk of heart failure. Public health initiatives targeting these modifiable risk factors continue to play an essential role in prevention strategies. Genetic factors have also received increasing attention. Advances in molecular genetics have improved understanding of inherited cardiomyopathies and genetic predisposition to heart failure. Identification of specific genetic mutations has facilitated earlier diagnosis and personalized approaches to patient management.In summary, the etiological profile of CHF has evolved from a predominantly ischemic and hypertensive disease toward a multifactorial syndrome influenced by metabolic disorders, renal dysfunction, arrhythmias, aging, and lifestyle factors. Understanding these changing risk factors is essential for developing effective preventive and therapeutic strategies. The clinical course of chronic heart failure has changed substantially over the last twenty years due to advances in diagnostic techniques, therapeutic interventions, and disease management strategies. These developments have improved survival while simultaneously increasing the number of patients living with chronic symptoms and multiple comorbidities. Traditionally, heart failure was viewed primarily as a progressive syndrome characterized by worsening dyspnea, fatigue, peripheral edema, and repeated hospitalizations. Although these symptoms remain central to diagnosis, contemporary patients often present with more heterogeneous clinical manifestations. Improved awareness and earlier detection have enabled clinicians to identify heart failure at earlier stages before severe functional impairment develops. The New York Heart Association (NYHA) functional classification continues to be widely used for assessing symptom severity and functional capacity. Patients are categorized into four classes ranging from asymptomatic disease to severe limitation of physical activity. Despite its subjective nature, the NYHA classification remains valuable for clinical decision-making and prognosis assessment. One of the most important developments has been the refinement of heart failure classification based on left ventricular ejection fraction (LVEF). Historically, patients were broadly classified as having systolic or diastolic heart failure. Contemporary guidelines recognize four major phenotypes:

1. Heart Failure with Reduced Ejection Fraction (HFrEF; LVEF ≤40%)
2. Heart Failure with Mildly Reduced Ejection Fraction (HFmrEF; LVEF 41–49%)
3. Heart Failure with Preserved Ejection Fraction (HFpEF; LVEF ≥50%)
4. Heart Failure with Improved Ejection Fraction (HFimpEF)

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

This classification reflects important differences in pathophysiology, prognosis, and treatment response.

The prevalence of HFpEF has increased significantly during the past two decades. Patients with HFpEF are typically older, more often female, and frequently have hypertension, obesity, diabetes mellitus, and atrial fibrillation. Unlike HFrEF, where evidence-based therapies have long been established, treatment options for HFpEF remained limited until recent years.Advances in imaging technologies have transformed heart failure diagnosis and monitoring. Echocardiography remains the cornerstone of evaluation, providing information about ventricular function, chamber dimensions, valvular abnormalities, and hemodynamics. Cardiac magnetic resonance imaging, computed tomography, and nuclear imaging techniques have further enhanced diagnostic accuracy.Biomarkers have become increasingly important in clinical practice. Natriuretic peptides, including B-type natriuretic peptide (BNP) and N-terminal pro-BNP (NT-proBNP), are widely used for diagnosis, risk stratification, and therapeutic monitoring. Elevated biomarker levels correlate strongly with disease severity and adverse outcomes. The natural history of CHF has also changed. Improved treatment has reduced mortality and delayed disease progression. Consequently, many patients now live longer with chronic heart failure, resulting in greater emphasis on quality of life, symptom control, rehabilitation, and long-term disease management. Multidisciplinary care models involving cardiologists, primary care physicians, nurses, pharmacists, and rehabilitation specialists have become increasingly important.Overall, the clinical course of CHF has evolved from a rapidly progressive and frequently fatal condition to a chronic manageable syndrome. Nevertheless, significant challenges remain regarding disease progression, recurrent hospitalizations, and the growing burden of multimorbidity. The evolution of pharmacological therapy represents one of the most remarkable achievements in the management of chronic heart failure over the past twenty years. Therapeutic advances have significantly improved survival, reduced hospitalizations, and enhanced quality of life for millions of patients worldwide. At the beginning of the 2000s, treatment of CHF primarily focused on symptom relief and hemodynamic improvement. Diuretics were widely used to reduce fluid overload and alleviate symptoms such as dyspnea and peripheral edema. Loop diuretics, particularly furosemide, became standard therapy for volume management. Digoxin remained an important therapeutic option, especially for patients with atrial fibrillation and symptomatic heart failure. Although digoxin improved symptoms and reduced hospitalizations, its effect on overall mortality was limited. The introduction of angiotensin-converting enzyme (ACE) inhibitors revolutionized heart failure treatment. Drugs such as enalapril, lisinopril, captopril, and ramipril demonstrated significant reductions in mortality and hospitalization rates. ACE inhibitors became the cornerstone of therapy for patients with HFrEF.For patients intolerant to ACE inhibitors, angiotensin receptor blockers (ARBs), including losartan, valsartan, and candesartan, provided effective alternatives. These agents offered similar hemodynamic benefits while minimizing adverse effects such as cough. One of the most important advances in CHF treatment was the widespread adoption of beta-blockers. Initially considered contraindicated because of their negative inotropic effects, large clinical trials demonstrated that beta-blockers substantially improve survival.

Conclusion

Over the past twenty years, chronic heart failure has undergone profound epidemiological, clinical, and therapeutic transformations. The prevalence of CHF has increased due to population aging, improved survival after cardiovascular events, and the growing burden of metabolic and renal diseases. Simultaneously, the clinical profile of heart failure patients has become increasingly complex, characterized by multimorbidity and a rising prevalence of HFpEF. Advances in diagnostic techniques, biomarker assessment, and disease classification have improved the accuracy of diagnosis and risk

HSR (LONDON),
HOUGHTON STREET REVIEW JOURNAL
ISSN: 2058-5519|Impact factor-15.9
http://houghtonstreetreview.com/index.php/hsr

stratification. Most importantly, pharmacological treatment has evolved from symptom-oriented management to evidence-based therapies capable of significantly reducing mortality and hospitalization rates. The introduction of beta-blockers, mineralocorticoid receptor antagonists, ARNIs, and SGLT2 inhibitors has transformed the prognosis of patients with heart failure. Modern treatment strategies now focus on comprehensive neurohormonal and metabolic modulation, providing unprecedented improvements in patient outcomes. Despite these achievements, CHF remains a major global health challenge associated with substantial morbidity, mortality, and healthcare costs. Continued research, early prevention, optimized treatment strategies, and multidisciplinary care models are essential for further reducing the burden of chronic heart failure and improving the quality of life of affected individuals.

References

1. McDonagh TA, Metra M, Adamo M, Gardner RS, Baumbach A, Böhm M, et al. 2023 Focused Update of the 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. Eur Heart J. 2023;44(37):3627–3639.
2. Heidenreich PA, Bozkurt B, Aguilar D, Allen LA, Byun JJ, Colvin MM, et al. 2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure. Circulation. 2022;145–e1032.
3. McDonagh TA, Metra M, Adamo M, Gardner RS, Baumbach A, Böhm M, et al. 2021 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. Eur Heart J. 2021;42(36):3599–3726.
4. Ponikowski P, Voors AA, Anker SD, Bueno H, Cleland JGF, Coats AJS, et al. 2016 ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure. Eur Heart J. 2016;37:2129–2200.
5. Virani SS, Alonso A, Aparicio HJ, Benjamin EJ, Bittencourt MS, Callaway CW, et al. Heart Disease and Stroke Statistics—2024 Update. Circulation. 2024.
6. Savarese G, Lund LH. Global Public Health Burden of Heart Failure. Card Fail Rev. 2017;3(1):7–11.
7. Conrad N, Judge A, Tran J, et al. Temporal trends and patterns in heart failure incidence. Lancet. 2018;391:572–580.
8. Roger VL. Epidemiology of Heart Failure. Circ Res. 2021;128:1421–1434.
9. Braunwald E. Heart Failure. JACC Heart Fail. 2013;1:1–20.
10. Zannad F, Ferreira JP, Pocock SJ, et al. SGLT2 inhibitors in heart failure: current evidence and future directions. Lancet. 2020.