Clinical Audit

Women and heart failure: Bridging the gap between disease burden and evidence-based treatment

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Abstract

Background: Heart failure (HF) is a leading cause of morbidity and mortality among women. Despite the availability of guideline-directed medical therapy (GDMT), treatment gaps persist, potentially impacting clinical outcomes.

Objective: To evaluate the clinical characteristics, comorbidities, GDMT utilization, and readmission among women hospitalized with heart failure over a one-year three month period.

Methods: A retrospective observational study was conducted among 110 women diagnosed with heart failure over one year. Data on demographics, comorbidities, echocardiographic findings, diagnoses, GDMT utilization and readmissions were collected and analyzed descriptively.

Results: Among 110 women with heart failure, most were aged 50–79 years (80.9%). Severe left ventricular dysfunction was observed in 58.2% of patients. Diabetes mellitus and hypertension were the most common comorbidities (54.5%), while coronary artery disease was the leading underlying diagnosis (45.5%). Although 93.6% of patients received at least one component of GDMT, only 18.2% received all four recommended therapies. Overall survival was 97.3%, with mortality and readmission rates of 2.7% and 4.5%, respectively.

Conclusion: Women with heart failure demonstrated a significant burden of cardiovascular risk factors and ventricular dysfunction. Despite widespread use of individual GDMT components, complete implementation remained suboptimal. Enhancing adherence to evidence-based therapies may further improve outcomes and reduce the burden of heart failure in women.

Key words: Heart failure (HF); Guideline-directed medical therapy (GDMT); Morbidity and mortality

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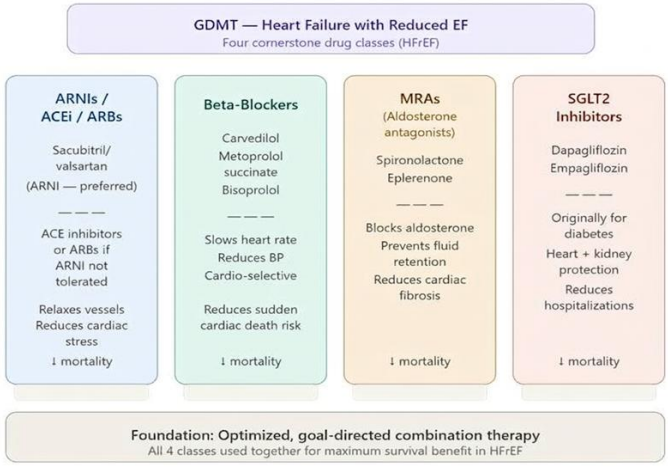
1. Introduction

Heart failure (HF) is a complex clinical syndrome and a growing global health challenge associated with substantial morbidity, mortality, recurrent hospitalizations, and healthcare costs. Despite advances in diagnosis and treatment, HF continues to impose a significant burden on patients, healthcare systems, and society. Women account for nearly half of all heart failure cases worldwide and represent a distinct population with unique clinical characteristics, disease trajectories, and therapeutic needs. However, they have historically been underrepresented in major clinical trials, resulting in important gaps in sex-specific evidence and treatment optimization.

Women with heart failure often present at an older age and frequently have multiple cardio metabolic comorbidities, including hypertension, diabetes mellitus, obesity, and coronary artery disease. Notably, the risk of heart failure increases after menopause, when the decline in estrogen's cardio protective effects contributes to adverse cardiovascular remodeling, endothelial dysfunction, and increased susceptibility to cardiovascular disease. Women commonly experience symptoms such as breathlessness, fatigue, exercise intolerance, and fluid overload, which can contribute to delayed diagnosis and recurrent decompensation. Furthermore, women demonstrate a broad spectrum of cardiac dysfunction ranging from preserved to severely reduce left ventricular ejection fraction, highlighting the heterogeneity of disease presentation and the need for individualized management strategies.

Guideline-Directed Medical Therapy (GDMT), comprising renin-angiotensin system inhibitors (ACEI/ARB/ARNI), beta-blockers, mineralocorticoid receptor antagonists (MRAs), and sodium-glucose cotransporter-2 (SGLT2) inhibitors, has transformed the management of heart failure by reducing mortality, hospitalizations, and disease progression. Despite strong evidence supporting these therapies, real-world studies consistently demonstrate suboptimal GDMT utilization, particularly among women. Underprescription, delayed initiation, and failure to achieve target therapy remain common, contributing to adverse clinical outcomes and preventable healthcare utilization. Therefore, this study aimed to evaluate the clinical profile, echocardiographic characteristics, comorbidities, GDMT utilization, readmission patterns, and mortality among women with heart failure over a one-year period, thereby identifying opportunities to strengthen evidence-based care and optimize patient outcome.



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Four Pillars of Heart failure Treatment

- ACEs/ARBs/ Angiotensin Receptor-Neprilysin Inhibitors (ARNIs)
- Cardio selective Beta Blockers
- Mineralocorticoid Receptor Antagonists (MRA)
- Sodium-Glucose Co-Transporter 2 (SGLT-2) inhibitors

Heart failure remains a significant global health challenge, affecting millions of individuals worldwide and imposing substantial burdens on healthcare systems. Despite advances in therapeutic strategies, HF continues to be associated with high rates of morbidity, mortality, and hospitalizations, making it a leading cause of cardiovascular-related deaths globally.

2. Methodology

Study Design

A retrospective observational study was conducted to evaluate the clinical characteristics, treatment patterns, and outcomes among women diagnosed with heart failure.

Study Setting and Duration

The study was carried out at Kauvery Heart City using data collected over a one-year three-month period from January 2025 to April 2026.

Study Population

All female patients admitted with a diagnosis of CAD, Severe LV, heart failure during the study period were included. A total of 110 women with heart failure were evaluated.

Data Collection

Data were retrieved from hospital electronic medical records and included:

- Demographic characteristics (age)
- Presenting complaints
- Comorbidities (diabetes mellitus, hypertension, coronary artery disease, etc.)
- Echocardiographic findings and ejection fraction (EF)
- Heart failure diagnosis and etiology
- Medications prescribed, including components of Guideline-Directed Medical Therapy (GDMT)
- Readmission status

Assessment of GDMT

GDMT utilization was assessed based on the receipt of the four recommended therapy classes:

- SGLT2 inhibitors
- ACE inhibitors/ARBs/ARNIs
- Mineralocorticoid receptor antagonists (MRAs)
- Evidence-based beta-blockers

Patients were categorized according to the number of GDMT components received (0, 1, 2, 3, or 4 therapies).

Outcome Measures

The primary outcomes were:

- GDMT utilization patterns

Secondary outcomes included:

- Readmission rates
- Distribution of comorbidities
- Echocardiographic characteristics
- Clinical profile of women with heart failure

Categorical variables were expressed as frequencies and percentages, while continuous variables were summarized using appropriate descriptive measures.

3. Results

Age Distribution:

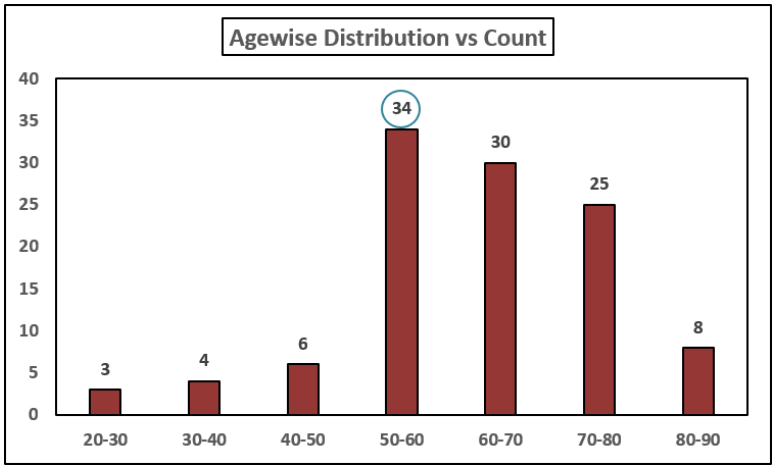

Fig (1): A total of 110 women with heart failure were included in the study. The majority of patients were between 50 and 79 years of age (80.9%). The largest age group was 50–60 years (30.9%), followed by 60–70 years (27.3%) and 70–80 years (22.7%).

Presenting Complaints

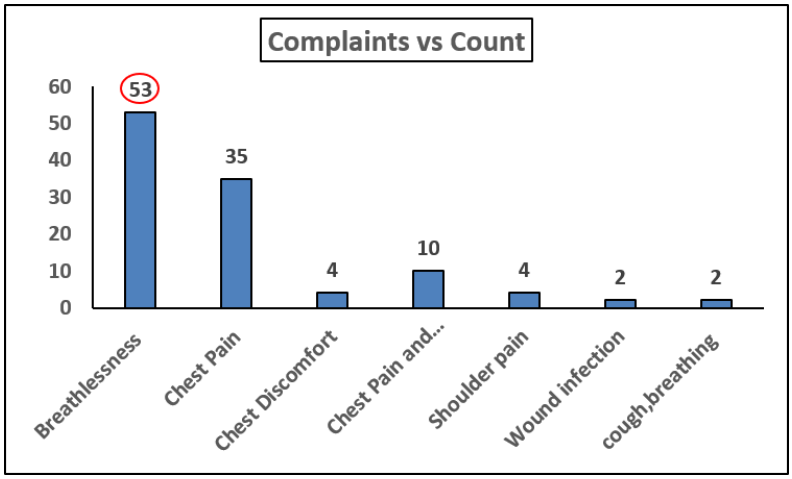

Fig (2): Breathlessness was the most common presenting symptom, reported in 53 patients (48.2%), and followed by chest pain in 35 patients (31.8%). A smaller proportion of patients presented with combined chest pain and breathlessness (9.1%), while chest discomfort, shoulder pain, wound infection, and cough with breathlessness were less frequently observed. These findings indicate that dyspnea and ischemic symptoms were the predominant clinical manifestations of heart failure in women.

Comorbidities

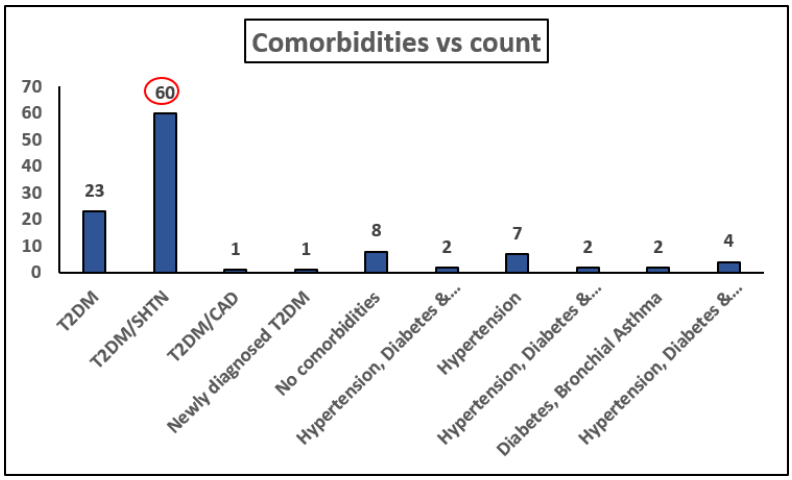

Fig (3): Diabetes mellitus and hypertension were the most common comorbidities. More than half of the patients (54.5%) had both diabetes and hypertension, highlighting the significant cardiometabolic burden among women with heart failure.

Echocardiographic Findings

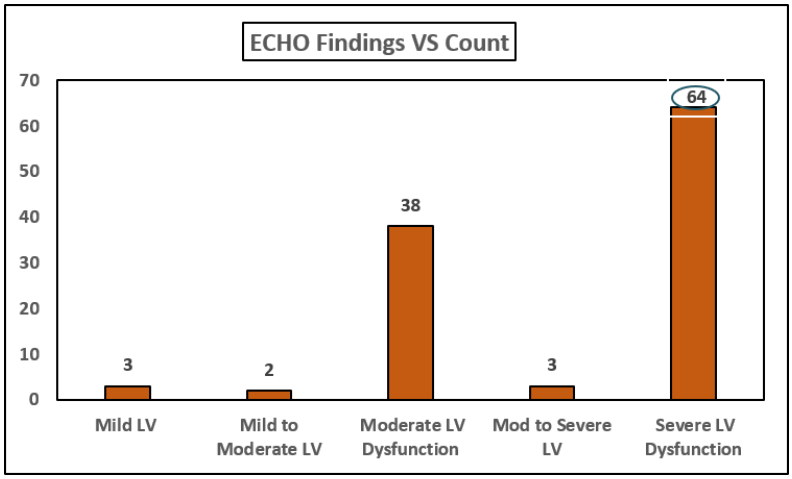

Fig (4): Severe left ventricular dysfunction was the predominant echocardiographic finding, observed in 64 patients (58.2%), and followed by moderate left ventricular dysfunction in 38 patients (34.5%). This indicates that the majority of women presented with advanced cardiac dysfunction

4. Diagnosis

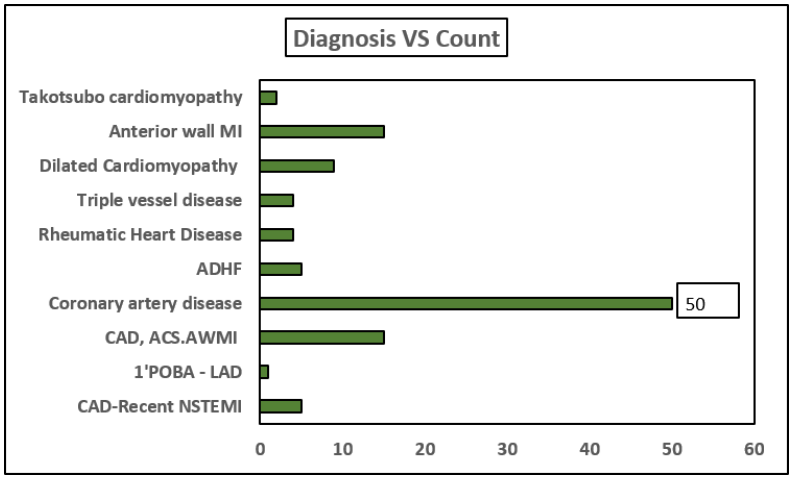

Fig (5): Coronary artery disease was the most common underlying diagnosis, accounting for 50 patients (45.5%). Other diagnoses included acute coronary syndrome, myocardial infarction, dilated cardiomyopathy, rheumatic heart disease, and acute decompensated heart failure, emphasizing the major role of ischemic heart disease in women with heart failure.

Guideline-Directed Medical Therapy (GDMT)

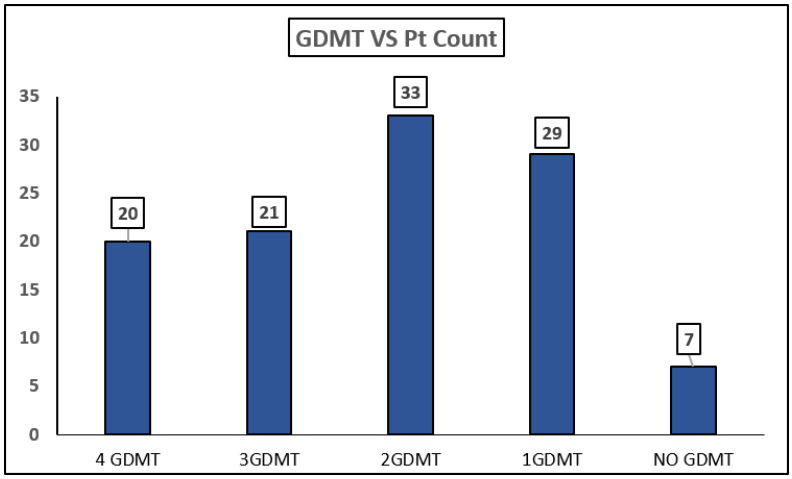

Fig (6): Among the 110 women with heart failure, only 20 patients (18.2%) received all four components of Guideline-Directed Medical Therapy (GDMT), while 21 patients (19.1%) received three components. The largest proportion of patients received two GDMT components (33 patients, 30.0%), followed by one GDMT component (29 patients, 26.4%). Notably, 7 patients (6.4%) did not receive any GDMT indicating a significant treatment gap between guideline recommendations in clinical practice

Medication Utilization:

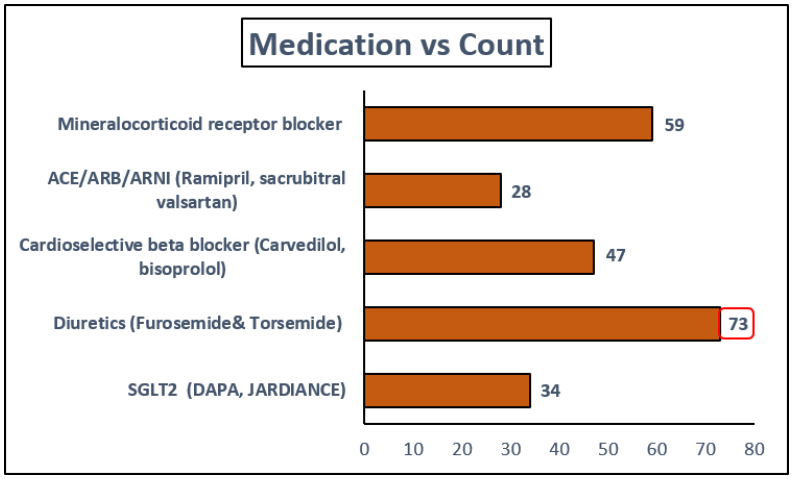

Fig (7): Diuretics were the most frequently prescribed medications (66.4%), followed by mineralocorticoid receptor antagonists (53.6%), beta-blockers (42.7%), SGLT2 inhibitors (30.9%), and ACEI/ARB/ARNI therapy (25.5%). This pattern highlights the greater utilization of symptom-relieving therapies compared with comprehensive GDMT optimization.

Readmission

Readmission Diagnosis	Patient	Receiving GDMT
CAD + AWMI	2	2
Recurrent ADHF	1	1
Decompensated HF	1	2
Recent AWMI	1	1

Fig(8): A total of 5 patients (4.5%) experienced readmission during the study period. Readmitted patients predominantly had multiple comorbidities and varying degrees of left ventricular dysfunction.

GDMT According to Ejection Fraction

EF %	25%	Below 30 %	30%	33%	35%	40%	Total
4 GDMT		4	7	1	6	2	20
3 GDMT		4	7	1	6		18
2 GDMT	1	4	18	3	6	5	37
1 GDMT	1	4	8	3	10	2	28
0 GDMT	1		3	1	2		7
Grand Total							110

Fig (9): Although patients with severely reduced ejection fraction (<30%) represent the group most likely to benefit from comprehensive Guideline-Directed Medical Therapy (GDMT), complete implementation of all four GDMT pillars was not consistently achieved. A substantial proportion of patients with low EF received only one or two GDMT components, while some received no GDMT, highlighting a significant gap between disease severity and evidence-based treatment.

Association between GDMT and Readmission

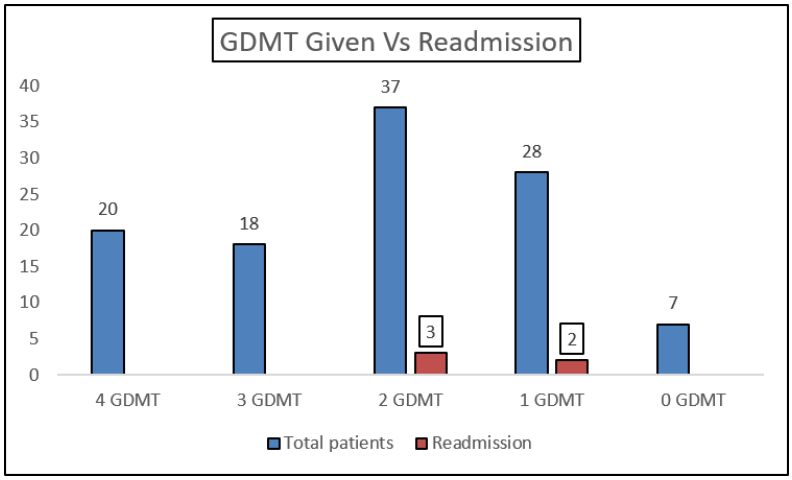

Fig (10): Among patients who experienced readmission, most had received only partial GDMT rather than all four recommended therapies. Although the overall readmission rate was low, this observation suggests a potential relationship between incomplete GDMT utilization and recurrent hospitalization.

5. Discussion

This one-year three-month study highlights the significant burden of heart failure among women, characterized by a high prevalence of diabetes mellitus, hypertension, coronary artery disease, and severe left ventricular dysfunction. A notable finding was that the majority of patients belonged to the postmenopausal age group, suggesting the potential influence of hormonal changes and age-related cardiovascular risk factors on

the development and progression of heart failure in women. This emphasizes the importance of considering menopausal status while evaluating cardiovascular risk and implementing preventive strategies.

Despite the proven benefits of Guideline-Directed Medical Therapy (GDMT), complete implementation of all four foundational therapies remained suboptimal, revealing a persistent gap between evidence-based recommendations and real-world clinical practice. While mortality and readmission rates were relatively low, the underutilization of comprehensive GDMT represents a missed opportunity to further improve patient outcomes.

These findings underscore the need for early identification of high-risk women, particularly those in the postmenopausal period, along with aggressive management of cardio metabolic risk factors, timely initiation and optimization of GDMT, and structured follow-up care. Bridging the gap between disease burden and evidence-based treatment is essential to improving survival, reducing hospitalizations, and enhancing the quality of life of women living with heart failure.

6. Limitation

This was a single-center retrospective study with a relatively small sample size and limited follow-up. Long-term outcomes, GDMT dose optimization, and reasons for incomplete therapy were not assessed. In addition, menopausal status was not systematically documented, limiting evaluation of its direct impact on heart failure outcomes.

7. Conclusion

Women with heart failure in this cohort demonstrated a high burden of cardio metabolic comorbidities, predominantly postmenopausal status, and advanced left ventricular dysfunction. Despite the severity of disease and strong evidence supporting Guideline-Directed Medical Therapy (GDMT), complete implementation of all four foundational therapy pillars remained suboptimal, with most patients receiving only partial treatment. This treatment gap was evident even among patients with severely reduced ejection fraction, who stand to benefit the most from comprehensive GDMT. These findings underscore the urgent need for systematic initiation, optimization, and continuation of all four GDMT components to improve clinical outcomes, reduce hospitalizations, and enhance survival among women with heart failure.

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