

A Study on Prevalence, Predisposing Factors and Management of Heart Failure in Patients admitted in A Tertiary Care Teaching Hospital

B Lalthapuii¹, Ethal S K¹, Periyasamy V¹, Dr. Saritha K Narayanan², Dr. Angel Alphonsa Joseph³

¹*Department of Pharmacy, Annamalai University, Chidambaram, Tamil Nadu, India*

²*M.D., Associate Professor, Department of General Medicine, Government Cuddalore Medical College and Hospital, Chidambaram, Tamil Nadu, India*

³*Post Graduate, Department of General Medicine, Government Cuddalore Medical College and Hospital, Chidambaram, Tamil Nadu, India*

blalthapuii05@gmail.com

ethalsk98@gmail.com

v.periyasamy2000@gmail.com

sarithanarayanan60@gmail.com

angelalphonza@gmail.com

Corresponding Author:

Dr. Saritha K Narayanan

M.D., Associate Professor, Department of General Medicine, Government Cuddalore Medical College and Hospital, Chidambaram, Tamil Nadu, India.

Email ID: sarithanarayanan60@gmail.com

Abstract:

Heart failure (HF) poses a major public health challenge, marked by the heart's inability to meet the body's blood supply needs, leading to severe health complications and high morbidity and mortality rates. The rise in HF cases parallels aging populations and increasing prevalence of risk factors such as hypertension, diabetes mellitus, and obesity. This study aims to analyse the demographic and clinical profiles, management strategies, and predisposing factors of hospitalised HF patients at Government Medical College and Hospital. A prospective observational cross-sectional study was conducted over three months (May-July 2024), involving 72 inpatients with confirmed HF. Data were collected from patient case sheets using structured pro-forma. The study predominantly included older adults (50% aged 61-80 years) and men (60.9%). Key comorbidities were diabetes mellitus (66.7%), hypertension (50%), and coronary artery disease (45.8%). Reduced ejection fraction was common (54.2%). Management included ACE inhibitors, diuretics, statins, and various surgical interventions like CABG and PCI. Predisposing factors included advanced age, diabetes mellitus, hypertension, coronary artery disease, and lifestyle factors such as smoking and alcohol use. The findings underscore the complex nature of HF, highlighting the need for tailored management strategies and addressing risk factors to improve patient outcomes.

Keywords: Heart failure, prevalence, management strategies, predisposing factors risk, co morbidities

1. Introduction

Heart failure (HF) is a significant public health issue, defined by the heart's inability to pump sufficient blood to meet the body's needs. This condition leads to a cascade of health problems, including fluid retention, shortness of breath, and fatigue, severely impacting patients' quality of life.

HF is not only a leading cause of hospitalisation but also a major contributor to morbidity and mortality globally. As the population ages and risk factors like hypertension, diabetes mellitus, and obesity become more prevalent, the incidence of heart failure continues to rise.

Hospital-based studies are crucial in understanding the burden of heart failure, as they provide insights into the most severe cases and the effectiveness of current management strategies. These studies help identify trends in disease prevalence, highlight gaps in care, and uncover predisposing factors specific to the hospitalised population.

By focusing on patients admitted with heart failure, we can gain a deeper understanding of the condition's impact on healthcare systems and patient outcomes, ultimately guiding the development of more effective treatment and prevention strategies.

2. Aim and Objectives

Aim

The aim of the current study is to study the Prevalence, Predisposing Factors and Management of Heart Failure in Patients admitted in Tertiary Care Teaching Hospital

Objectives

- To analyse the demographic and clinical profiles of hospitalised HF patients
- To study the management strategies and predisposing factors of hospitalised HF patients

3. Materials and Methods

Study Design: This study is a *prospective observational cross-sectional study*.

Study Site: Department of Medicine at Government Medical College and Hospital, a 1250-bed tertiary care hospital, located in the rural part of south India.

Study Period: The study was took place over a period of 3 months, from May 2024 to July 2024.

Sample Size: The sample size for this study is 72 patients.

Study Tools: Data collection will be carried out using structured pro-forma designed for the study.

Source of Data: The primary source of data will be the case sheets of inpatients admitted to the hospital.

Study Population: The study included patients who are admitted to the hospital with a confirmed diagnosis of heart failure and are 18 years of age or older. Only those patients with complete and documented medical records and clinical data available for analysis are included.

However, the study excluded heart failure patients who are pregnant, those with incomplete medical records or missing clinical data necessary for analysis, and patients who are transferred to another healthcare facility during their hospital stay.

4. Results and Observation

Prevalence of Heart Failure

The study provides a snapshot of 72 patients diagnosed with heart failure, offering insights into how the condition manifests across different demographic and clinical profiles. The prevalence within this study reflects the broader trends observed in heart failure patients, where age, gender, duration of the disease, and severity based on ejection fraction, as well as comorbidities, play critical roles in the progression and outcomes of the condition.

Age-Related Prevalence

The distribution of heart failure prevalence across different age groups reveals significant trends. The majority of patients fall within the 61-80 years age range, comprising 50% of the sample. This finding aligns with the understanding that heart failure predominantly affects older adults, who are more susceptible to cardiovascular diseases. The 41-60 years age group makes up 33.3% of the population, indicating a notable number of middle-aged adults also being affected. The youngest (20-40 years) and oldest (>80 years) groups each represent 8.3% of the population, suggesting lower incidence rates in younger individuals due to fewer risk factors, and in the oldest group, potentially due to survivorship bias.

Gender Distribution

The gender distribution shows that men (61.2%) are more frequently affected by heart failure than women (38.8%). This pattern is consistent with broader epidemiological data, where men generally have a higher risk of developing heart failure at a younger age compared to women, likely due to differences in cardiovascular risk profiles.

Comorbidities

Diabetes mellitus is the most prevalent comorbidity among heart failure patients in this study, affecting 66.7% of the population. This is followed by hypertension (50%) and coronary artery disease (45.8%), both of which are well-known contributors to heart failure.

Chronic kidney disease (16.7%) and anaemia (8.3%) are also notable comorbidities, though less common. Chronic obstructive pulmonary disease and congenital heart disease each affect 8.3% and 4.2% of patients, respectively. The presence of multiple comorbidities in a significant portion of patients highlights the complex and multifactorial nature of heart failure.

Duration of Heart Failure

A significant proportion of patients 75% have been living with heart failure for less than 5 years, while the remaining 25% have had the condition for over 5 years. This could indicate that many patients are being diagnosed relatively early or that those with long-standing heart failure represent a more resilient group.

Severity of Heart Failure (Based on Reduced Ejection Fraction)

In the study population, the majority of patient exhibit reduced ejection fraction, with 61.2% having an ejection fraction of less than 40%, indicating severe systolic dysfunction and a high prevalence of advanced heart failure. Mid-range ejection fraction, between 41% and 49%, is observed in 20.8% of patients, reflecting a moderate degree of heart failure.

A preserved ejection fraction, greater than 50%, is present in 18% of patients, suggesting less severe heart failure or possibly heart failure with preserved ejection fraction due to diastolic dysfunction. This distribution highlights a predominance of severe systolic dysfunction in the study.

Table – 01: Demographic Details and Duration of Hospitalizations of HF patients

Prevalence	No. of patients (n=72)	Percentage (%)
Age Distribution		
20-40	6	8.3%
41-60	24	33.3%
61-80	36	50%
> 80	6	8.3%
Gender Distribution		
Male	44	61.2%
Female	28	38.8%
Duration of Heart Failure		
<5 yrs	54	75%
> 5 yrs	18	25%

PREDISPOSING FACTORS

Advanced Age

Advanced age is the most significant predisposing factor, affecting 91.7% of the patients. It is strongly correlated with heart failure mortality, highlighting the impact of aging on cardiovascular health. The decline in physiological reserve and the presence of multiple comorbidities in older adults contribute to the higher risk of heart failure and associated complications.

COMORBIDITIES

Diabetes mellitus

45.8%% of the study population had diabetes mellitus. This high prevalence emphasizes the significant role of diabetes in the development and progression of heart failure. Poor glycaemic control leads to cardiovascular complications, such as diabetic cardiomyopathy, which increases the risk of heart failure and mortality.

Hypertension

Hypertension is present in 50% of the patients; hypertension is a well-established risk factor for heart failure. Persistent high blood pressure over time can lead to left ventricular hypertrophy and subsequent heart failure, particularly if not adequately controlled.

Coronary Artery Disease (CAD)

CAD affects 45.8% of the patients and is a direct contributor to heart failure through ischemic heart damage. This association underscores the critical need for effective management of coronary artery disease to prevent the progression to heart failure.

Chronic Kidney Disease (CKD)

CKD is present in 25% of the patients. The relationship between CKD and heart failure is complex and bidirectional. CKD exacerbates heart failure by increasing fluid overload and complicating the management of heart failure, while heart failure can worsen kidney function due to reduced renal perfusion.

LIFESTYLE FACTORS

Alcoholic Use: Present in 75% of patients. Chronic alcohol consumption is a major risk factor for heart failure, leading to alcoholic cardiomyopathy and worsening overall cardiovascular health.

Smoker: Affects 45.8% of patients. Smoking contributes to heart failure through mechanisms such as atherosclerosis, increased risk of ischemic heart disease, and impaired myocardial oxygenation.

Table - 01: Predisposing factors of heart failure

Predisposing Factors	No. of patients (n=72)	Percentage (%)
Advanced Age	66	91.7%
Comorbidities		
Diabetes mellitus	33	54%
CKD	18	25%
Hypertension	36	50%
Lifestyle Factors		
Alcoholic Use	54	75%
Smoking	33	45.8%

MANAGEMENT STRATEGIES

Pharmacological Management

ACE Inhibitors and Diuretics:

ACE inhibitors were prescribed to 33.3% of patients, underscoring their essential role in reducing the progression of heart failure by lowering blood pressure and decreasing the heart’s workload. Diuretics were used by 62.5% of patients, reflecting their importance in managing fluid overload, a common symptom in heart failure patients. This combination is critical in alleviating symptoms and improving quality of life.

Statins and Anti-platelets:

Statins were prescribed to 75% of the patients, highlighting their role in managing hyperlipidaemia and reducing cardiovascular risk. Anti-platelet agents were equally common, prescribed to 75% of patients, underscoring their importance in preventing further myocardial ischemia, particularly in those with a history of coronary artery disease or other cardiovascular risk factors.

Beta Blockers and Anticoagulants:

Beta blockers, used by 29.2% of patients, are key in managing heart rate and reducing mortality, especially in those with reduced ejection fraction. Anticoagulants were prescribed to 16.7% of patients, likely reflecting their use in patients with atrial fibrillation or other conditions predisposing them to thromboembolic events.

Additional Medications:

The use of diabetic drugs in 58.3% of patients indicates the high prevalence of diabetes mellitus within this study, necessitating careful blood sugar management. H2 receptor antagonists were used by 83.3% of patients, possibly reflecting a need for gastrointestinal protection, particularly in patients on multiple medications. Antibiotics (79.2%) and antiemetics (58.3%) were also commonly used, indicating the presence of concurrent infections or the management of nausea, which can be common in heart failure patients.

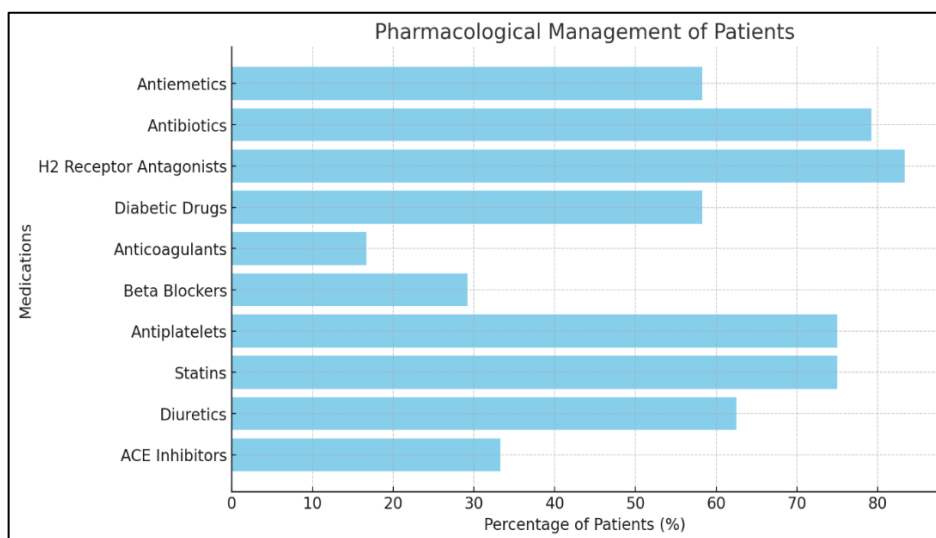


Figure - 01: Management of heart failure

Surgical and Interventional Management

CABG and PCI were each performed on 12.5% of patients, showing that many patients needed procedures to improve blood flow to the heart. These treatments are important for people with serious heart problems, as they help the heart work better.

Stent angioplasty, a less invasive option, was done in 4.2% of patients, indicating its usefulness in treating heart disease without major surgery. Overall, these procedures play a crucial role in improving patient outcomes and quality of life.

5. Discussion

The findings from this study offer a comprehensive overview of the demographic and clinical characteristics of patients with heart failure (HF) at Government Medical College and Hospital. The predominant occurrence of HF in older adults (50% aged 61-80 years) is consistent with the global trend of increasing HF prevalence among aging populations.

This age group's susceptibility to HF can be attributed to the cumulative effect of age-related physiological decline and the higher prevalence of predisposing risk factors.

The higher incidence of HF in men (61.2%) compared to women aligns with existing literature that suggests men are at greater risk for cardiovascular diseases at earlier ages. This discrepancy may be influenced by differences in cardiovascular risk profiles and potentially unaccounted lifestyle factors.

The study highlights the substantial burden of comorbidities among HF patients, with diabetes mellitus (66.7%) being the most prevalent. Diabetes mellitus' strong association with HF is well-documented, as it contributes to cardiovascular disease through mechanisms such as diabetic cardiomyopathy and increased risk of coronary artery disease. Hypertension (50%) and coronary artery disease (45.8%) further illustrate the interconnectedness of cardiovascular risk factors. The high prevalence of these conditions underscores the importance of integrated management strategies to address multiple risk factors concurrently.

The observation that 75% of patients have had HF for less than 5 years suggests early diagnosis and intervention, though it also indicates a need for on-going management to prevent progression. The predominance of reduced ejection fraction (61.2%) among the patients reflects a severe form of systolic dysfunction, pointing to the need for aggressive treatment strategies aimed at improving ejection fraction and overall cardiac function.

Pharmacological management in this study was aligned with established treatment protocols. The use of ACE inhibitors (33.3%) and diuretics (62.5%) highlights their critical roles in managing symptoms and progression of HF. Statins and anti-platelets were widely prescribed, indicating a focus on managing concurrent cardiovascular risk factors. However, the relatively low use of beta blockers (29.2%) and anticoagulants (16.7%) may suggest gaps in optimal therapy, particularly in patients with reduced ejection fraction or atrial fibrillation.

Surgical interventions such as CABG and PCI were performed in a notable subset of patients, emphasising the need for revascularization in those with significant coronary artery disease.

The predisposing factors identified are advanced age, diabetes mellitus, hypertension, coronary artery disease, and lifestyle factors such as smoking and alcohol use—underscore the multifaceted nature of HF. Addressing these factors through preventive measures and targeted therapies is crucial for improving patient outcomes and managing the growing burden of HF.

6. Conclusion

This study provides valuable insights into the demographic and clinical profiles of heart failure patients at Government Medical College and Hospital. The findings emphasise the predominance of HF among older adults and the significant role of comorbid conditions such as diabetes mellitus, hypertension, and coronary artery disease. The management strategies employed reflect current clinical practices, though there is room for improvement in optimising treatment, particularly with beta blockers and anticoagulants.

The high prevalence of advanced age, diabetes mellitus, and lifestyle risk factors among the patients highlights the need for comprehensive approaches to HF management. Effective strategies should include addressing risk factors, improving early diagnosis, and implementing tailored treatment plans to enhance patient outcomes. Future research should focus on refining management protocols and exploring interventions to mitigate the impact of predisposing factors, ultimately contributing to better quality of life for HF patients.

7. References

1. Beri, B., Fanta, K., Bekele, F. et al. Management, clinical outcomes, and its predictors among heart failure patients admitted to tertiary care hospitals in Ethiopia: prospective observational study. *BMC Cardiovasc Disord* 23, 4 (2023). <https://doi.org/10.1186/s12872-022-03008-7>
2. Emmons-Bell, S., Johnson, C., & Roth, G. (2022). Prevalence, incidence and survival of heart failure: a systematic review. *Heart*, 108(17), 1351-1360
3. Mishra, S., Mohan, J. C., Nair, T., Chopra, V. K., Harikrishnan, S., Guha, S., ... & Bahl, V. K. (2018). Management protocols for chronic heart failure in India. *Indian heart journal*, 70(1), 105-127.
4. Tomp, J., Tay, W. T., Ouwerkerk, W., Teng, T. H. K., Yap, J., MacDonald, M. R., ... & ASIAN-HF authors. (2018). Multimorbidity in patients with heart failure from 11 Asian regions: a prospective cohort study using the ASIAN-HF registry. *PLoS medicine*, 15(3), e1002541.
5. Abebe, T. B., Gebreyohannes, E. A., Tefera, Y. G., & Abegaz, T. M. (2016). Patients with HFpEF and HFrEF have different clinical characteristics but similar prognosis: a retrospective cohort study. *BMC cardiovascular disorders*, 16, 1-8.
6. Kannel, W. B., D'Agostino, R. B., Silbershatz, H., Belanger, A. J., Wilson, P. W., & Levy, D. (1999). Profile for estimating risk of heart failure. *Archives of internal medicine*, 159(11), 1197-1204.
7. Farré, N., Lupon, J., Roig, E., Gonzalez-Costello, J., Vila, J., Perez, S., ... & Comin-Colet, J. (2017). Clinical characteristics, one-year change in ejection fraction and long-term outcomes in patients with heart failure with mid-range ejection fraction: a multicentre prospective observational study in Catalonia (Spain). *BMJ open*, 7(12), e018719.
8. Shiga, T., Suzuki, A., Haruta, S., Mori, F., Ota, Y., Yagi, M., ... & HIJ-HF II Investigators. (2019). Clinical characteristics of hospitalized heart failure patients with preserved, mid-range, and reduced ejection fractions in Japan. *ESC heart failure*, 6(3), 475-486.