Heart failure in the elderly: disease staging, comorbidities, caregiver burden and caregiver perspective at a tertiary-care hospital in India

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ABSTRACT

Background: Heart failure (HF) in older adults is marked by advanced stages, multimorbidity, functional dependence, and recurrent utilization, placing substantial strain on informal caregivers. Indian data on caregiver burden and perspectives in geriatric HF remain limited. This study was conducted to evaluate the clinic demographic profile of heart failure in elderly patients who attend the outpatient department of our tertiary care centre. Additionally, to assess the level of caregiver burden and their knowledge and attitude about the disease. **Material & Methods:** This was a hospital-based cross-sectional observational study conducted over 18 months at JSS Hospital, Mysuru. A total of 105 elderly heart failure patients (aged ≥60 years) and their caregivers were included. Patient assessment included demographics, NYHA classification, AHA/ACC staging, functional dependency (ADL), comorbidities, and number of hospitalizations for heart failure symptoms. Caregivers were assessed for age, gender, relationship with patient, education, employment, duration of caregiving, burden (BSFC-s), and knowledge regarding HF, palliative care, and advance directives through a self-designed Caregiver Disease Perspective Scale. **Results:** The average age of the patients was 75.88 ± 7.9 years, with 48.57% falling in the 65–74 age group. Heart failure with preserved ejection fraction (HFpEF) emerged as the most prevalent subtype, accounting for 44.8% of cases. The majority of patients were classified as NYHA Class III/IV (98.1%) and Stage C/D (100%), indicating advanced disease. Dependence in activities of daily living (ADLs) was observed in 61.9% of patients. A significant proportion had two or more hospital (58.10%) and ICU (47.60%) admissions in a year, underscoring the severity and recurrent nature of the illness. Most caregivers were informal, primarily family members

(94.28%), and typically middle-aged, with a mean age of 54.82 ± 10.53 years. 56.2% of caregivers reported experiencing financial stress. Moderate to severe caregiver burden was noted in 82.8% of cases. Although 68.57% of caregivers were educated, awareness of palliative care (27.6%) and advance directives (15.2%) remained limited. **Conclusion:** Heart failure in the elderly is associated with advanced clinical stages, high dependency, and frequent hospitalization. Caregivers, largely informal and middle-aged, experience high levels of burden and limited awareness about chronic care and end-of-life planning. The study highlights the urgent need for caregiver education, financial and psychological support, and early integration of geriatric and palliative care services.

Keywords: Burden Scale for Family Caregivers–short version (BSFC-s), Caregiver burden, Elderly, Heart failure, Palliative care

1. INTRODUCTION

Heart failure (HF) is a leading cause of morbidity and mortality in older adults, with prevalence rising steadily as populations age and survival after acute cardiovascular events improves [1]. Estimates suggest that more than 23 million people worldwide live with HF, and the burden is disproportionately high in the elderly, where functional decline, frailty, and multimorbidity complicate disease management [2,3]. Despite therapeutic advances, prognosis in elderly HF remains poor, particularly in advanced stages and among those with multiple comorbidities [4].

Elderly patients frequently present with atypical symptoms and preserved ejection fraction, making diagnosis and treatment challenging [5]. Hypertension, ischemic heart disease, diabetes, and chronic kidney disease are major contributors to HF in this age group [6]. The resulting high rates of hospital readmissions, polypharmacy, and disability impose significant demands on healthcare systems and families [7].

Caregivers, most often family members in low- and middle-income countries, assume central responsibility in supporting daily activities, ensuring treatment adherence, and coordinating healthcare visits [8]. However, this role comes with substantial emotional, financial, and physical strain, commonly referred to as caregiver burden [9]. Studies show that increased caregiver stress correlates with poorer patient outcomes, higher risk of hospitalizations, and reduced quality of life for both patients and caregivers [10,11]. Despite this, caregiver perspectives remain underexplored in the Indian context, where formal

caregiving structures are limited, and cultural expectations place the burden predominantly on families [12].

Recognizing caregivers as partners in HF management is now emphasized in international guidelines, which recommend integrating psychosocial support, caregiver education, and palliative care into chronic disease management [13,14]. Yet, evidence from India on caregiver experiences, burden levels, and awareness of palliative care in elderly HF patients is scarce. Against this background, the present study was undertaken to assess HF staging, comorbidities, caregiver burden, and caregiver perspectives in a tertiary care hospital in southern India.

2. MATERIALS AND METHODS

2.1.Study Design and Setting

This hospital-based cross-sectional study was conducted in the Departments of Geriatrics and Cardiology at JSS Hospital, Mysuru, Karnataka, a tertiary care teaching hospital. The study was carried out over a period of 18 months following approval from the Institutional Ethics Committee.

2.2.Study Population

A total of 105 consecutive patients aged 60 years and above with a clinical diagnosis of heart failure were enrolled along with their primary caregivers. Heart failure was diagnosed based on standard clinical evaluation, echocardiographic findings, and elevated NT-proBNP levels in accordance with guideline recommendations [13,14].

2.3.Inclusion and Exclusion Criteria

The primary caregiver was defined as the individual who bore the main responsibility for the patient’s daily care. Patients aged below 60 years, in acute decompensated heart failure and unwilling to provide informed consent, and caregivers who were unwilling to be a part of the study were excluded.

2.4.Data Collection

Data were collected using a structured proforma. For patients, information included demographics, comorbidities such as hypertension, diabetes, chronic kidney disease, ischemic heart disease, as well as disease severity assessed by the American College of Cardiology/American Heart Association (ACC/AHA) staging and New York Heart Association (NYHA) functional classification. Functional status was evaluated using the Barthel Index-Activities of Daily Living (ADL) scale. Echocardiographic parameters, including left ventricular ejection fraction, chamber dimensions, and valvular involvement,

along with NT-proBNP assay results, were recorded. Healthcare utilization patterns, including the number of hospitalizations and intensive care unit admissions during the previous year, were also noted.

Caregiver data encompassed demographic characteristics, relationship with the patient, duration of caregiving, employment status, and self-reported financial constraints. Caregiver burden was assessed using the Burden Scale for Family Caregivers – short version (BSFC-s) [15], while knowledge and perceptions regarding heart failure and its management were evaluated using the Caregiver Disease Perspective Scale (CDPS), a structured questionnaire developed and validated for this study.

2.5.Statistical Analysis

All data were entered into Microsoft Excel and analysed using SPSS version 26.0 (IBM Corp., Armonk, NY, USA). Continuous variables were expressed as mean ± standard deviation (SD) and categorical variables as frequencies and percentages.

3. RESULTS

3.1.Baseline Characteristics of Patients

A total of 105 elderly patients with heart failure and their primary caregivers were enrolled. The mean age of patients was 75.9 ± 7.9 years, with nearly half (48.6%) belonging to the 65–74-year age group. Males comprised a slight majority (52.4%). The predominant phenotype was heart failure with preserved ejection fraction (HFpEF), observed in 44.8% of patients, followed by heart failure with reduced ejection fraction (HFrEF) in 40.0% and heart failure with mildly reduced ejection fraction (HFmrEF) in 15.2%. Almost all patients were in advanced stages of disease, with 84.8% in ACC/AHA Stage C and 15.2% in Stage D. Functionally, 98.1% of patients belonged to NYHA Class III or IV, and 61.9% demonstrated dependence in activities of daily living **(Table 1)**.

3.2.Comorbidities and Healthcare Utilization

Hypertension was the most frequent comorbidity, present in 67.6% of patients, followed by type 2 diabetes mellitus in 47.6% and chronic kidney disease in 39.1%. Ischemic heart disease was the most common suspected etiology, seen in 69.5%, while arrhythmias were documented in 20%. Frequent healthcare utilization was notable, with 58.1% of patients reporting two or more hospitalizations in the preceding year and 47.6% requiring two or more ICU admissions **(Table 1)**.

Table 1. Distribution of baseline data of patients

Baseline Variable (n=105)	N	%
Age (yrs)		
65 to 74	51	48.6
74 to 84	45	42.9
>=85	9	8.5
Gender		
Male	54	51.4
Female	51	48.6
HF phenotype		
HFpEF	47	44.8
HFrEF	42	40
HFmrEF	16	15.2
ACC/AHA Stage		
Stage C	89	84.8
Stage D	16	15.2
NYHA Class		
Class III	60	57.1
Class IV	43	41
ADL status		
Independent	40	38.1
Dependent	65	61.9
Comorbidities		
Hypertension	71	67.6
Diabetes mellitus	50	47.6
CKD	41	39.1
IHD	73	69.5
Arrhythmia	21	20
Hospitalization (past year)		
>=2 admissions	61	58.1
ICU admissions (past year)		
>=2 admissions	50	47.6

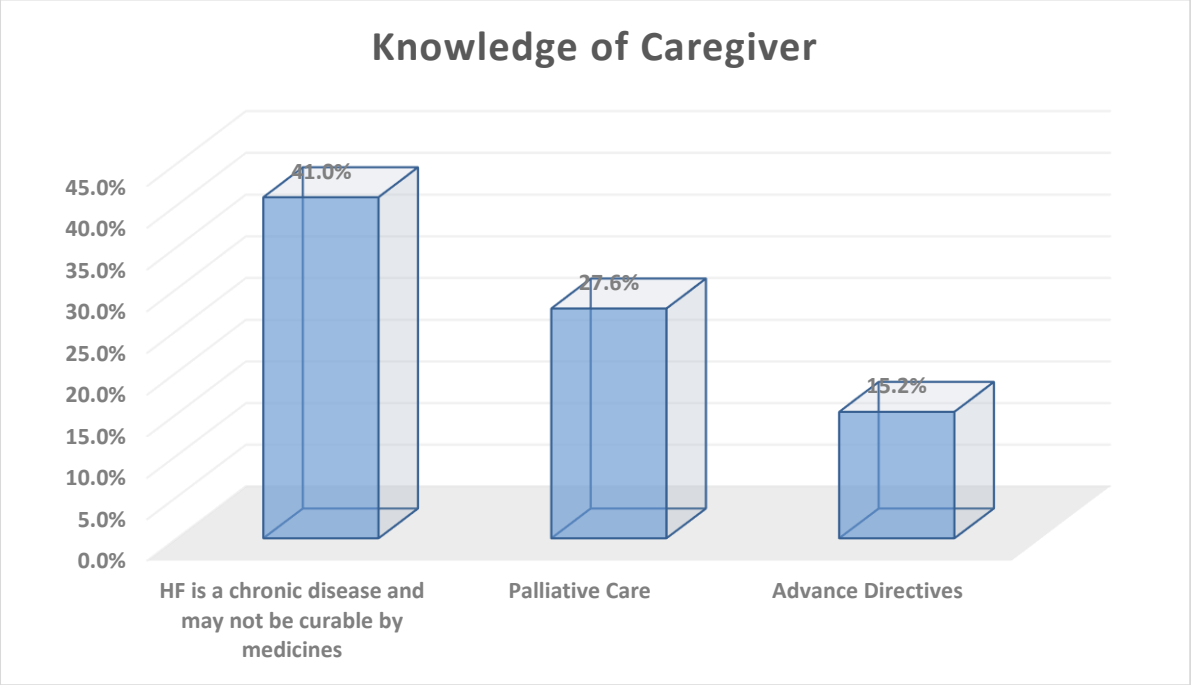
3.3.Caregiver Demographic Characteristics

Caregivers were predominantly informal family members (94.3%), with a mean age of 54.8 ± 10.5 years. The majority were women, and more than half (56.2%) reported financial constraints due to caregiving responsibilities. About four in five caregivers (81%) had been engaged in caregiving for more than 10 years. Despite 68.6% of caregivers having formal education, awareness of palliative care and advance directives remained low, at 27.6% and 15.2% respectively (**Table 2, Graph 1**).

Table 2. Distribution of baseline data of caregivers

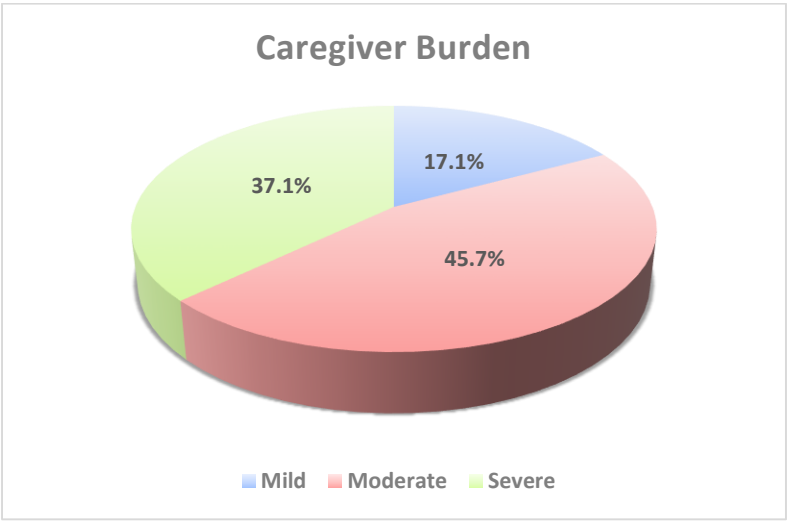
Caregiver Variable (n=105)	**N**	**%**
Age in years (mean ±SD)	54.8 ± 10.5	
Gender		
Male	45	42.9
Female	60	57.1
Relationship		
Family caregiver	99	94.3
Education		
Educated	72	68.6
Not educated	33	31.4
Employment		
Employed	61	58.1
Unemployed	44	41.9
Financial constraints		
Yes	59	56.2
No	46	43.8
Duration caregiving		
<=10 years	20	19.0
>10 years	85	81.0

Graph 1. Distribution as per knowledge of caregiver (assessed using the self-prepared questionnaire- Caregiver Disease Perspective Scale)



The burden of caregiving was considerable. Based on the Burden Scale for Family Caregivers–short version (BSFC-s), 45.7% of caregivers experienced moderate burden, while 37.1% reported severe burden. Only 17.2% reported mild or no burden (**Graph 2**). Caregivers frequently cited emotional exhaustion, financial strain, and social limitations as major challenges. Findings from the Caregiver Disease Perspective Scale further highlighted gaps in disease-related knowledge, particularly regarding the chronic, progressive, and incurable nature of heart failure.

Graph 2. Distribution as per Burden Scale for Family Caregivers (BSFC-s)



the results demonstrated that elderly patients presented predominantly with advanced heart failure and multiple comorbidities, while their caregivers, mostly family members, faced high levels of burden with limited awareness of palliative care and advance planning.

4. DISCUSSION

This study provides important insights into the clinical profile of elderly patients with heart failure in India and highlights the significant burden experienced by their caregivers. The mean age of our cohort was 75.9 years, comparable to findings from CHART-2 in Japan, where the average age of elderly HF patients was 73 years [2]. Nearly half of our participants were aged between 65–74 years, reflecting the shifting demographic burden of HF towards the "young-old," while still capturing substantial numbers of the oldest-old, a subgroup known to have worse outcomes [3].

In terms of HF phenotype, HFpEF was the most prevalent in our study (44.8%), consistent with epidemiological data indicating its predominance in elderly patients due to age-related myocardial and vascular changes [1,4]. HFrEF accounted for 40% of our cohort, slightly higher than the 29% reported in the European Society of Cardiology (ESC) Heart Failure Long-Term Registry [16]. Importantly, almost all patients in our study were in advanced functional stages (NYHA III/IV), underscoring late presentation and limited access to early diagnosis and intervention, a challenge also documented in Asian cohorts [2,3].

Comorbidities were highly prevalent, with hypertension (67.6%), diabetes (47.6%), and chronic kidney disease (39.1%) being most frequent. These rates are in line with previous reports, such as the study by Lorenzo et al., which showed that over 70% of super-elderly HF patients had two or more comorbidities [3]. The high prevalence of ischemic heart disease (69.5%) as an etiological factor in our population mirrors Indian epidemiological data, where coronary artery disease remains the dominant cause of HF [17]. These multimorbidities not only exacerbate functional decline but also contribute to repeated hospitalizations, which in our cohort affected nearly half of patients—similar to the readmission rates described in Western registries [18].

Caregivers in our study were predominantly family members (94.3%), reflecting the cultural reliance on informal care in low- and middle-income countries, where structured caregiving systems are scarce [12]. The mean caregiver age was 54.8 years, comparable to the demographics reported in caregiver studies globally [6,8]. More than half reported financial constraints, and nearly 83% experienced moderate-to-severe burden based on the BSFC-s. This level of strain is consistent with prior research showing that caregiver burden is

particularly pronounced in HF due to its unpredictable trajectory and high care demands [6,7,9]. Bidwell et al. demonstrated that higher caregiver stress was associated with worse patient adherence and survival [8,11], reinforcing the interdependence of caregiver and patient well-being.

Awareness of palliative care and advance directives was strikingly low in our cohort (27.6% and 15.2%, respectively), despite most patients being in advanced disease stages. This knowledge gap echoes findings from Western and Asian studies, which consistently report inadequate caregiver preparedness for end-of-life discussions [10,19]. The ESC and AHA/ACC guidelines emphasize early integration of palliative care and shared decision-making in advanced HF management [13,14]. However, such practices remain underutilized in India, where sociocultural taboos and limited-service availability hinder uptake.

In summary, our findings demonstrate that elderly HF patients present predominantly with advanced disease and multiple comorbidities, while their caregivers—mostly family members—face substantial burden with limited awareness of palliative care [20,21]. Addressing these gaps will require a paradigm shift towards integrated, family-centered HF management, incorporating structured caregiver education, psychosocial support, and early palliative interventions.

The major strength of this study lies in its focus on an elderly heart failure population from India, a group often underrepresented in clinical research. By including both patient clinical profiles and caregiver perspectives, the study provides a comprehensive view of the disease burden and its ripple effects on family members [22]. Use of validated tools such as the BSFC-s for caregiver burden and incorporation of a structured Caregiver Disease Perspective Scale further strengthen the methodological rigor [23,24].

However, several limitations must be acknowledged. Being a single-center, cross-sectional study with a modest sample size, the findings may not be generalizable to broader or rural populations. Self-reported data on caregiver burden and knowledge are subject to recall and social desirability biases. In addition, the study design precludes longitudinal assessment of disease progression, evolving caregiver burden, or the impact of interventions over time [25]. Finally, the caregiver knowledge scale, though carefully structured, would benefit from wider validation across diverse populations.

5. CONCLUSION

Elderly patients with heart failure in this study predominantly presented with advanced disease stages, high comorbidity burden, significant functional dependence and high hospital re-admission rates. Caregivers, largely family members, experienced substantial emotional, financial, and social strain, with most reporting moderate-to-severe burden. Awareness of palliative care and advance directives was limited, despite the advanced stage of illness in the majority of patients. These findings underscore the need for an integrated, family-centered approach to heart failure management in India, incorporating structured caregiver education, psychosocial support, and early palliative interventions to improve outcomes for both patients and their caregivers.

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