***Original Research Article***

**Clinical Characteristics of Acute Heart Failure Patients Admitted to Community-Based Medical College Hospital, Bangladesh**

**ABSTRACT**

***Background: Heart failure remains a growing public health challenge in Bangladesh, yet comprehensive data from community-based hospitals are lacking. Understanding local clinical patterns is crucial for improving management strategies. Objective: This study aimed to characterize the clinical presentation of heart failure patients admitted to a tertiary care hospital in Mymensingh, Bangladesh. Methods: A prospective cross-sectional study was conducted at the Community-Based Medical College Hospital from January 2023 to December 2024. We enrolled 113 consecutive heart failure patients through purposive sampling. Data collection included detailed history, physical examination, and echocardiographic evaluation. Analysis was performed using MS Office tools. Results: The cohort had a mean age of 62.4±11.3 years with male predominance (75.2%). Most patients (81.4%) had reduced ejection fraction (≤40%). Common presentations included dyspnea (96.5%), orthopnea (86.7%), and basal crepitations (92.9%). Frequent comorbidities were diabetes (72.6%), hypertension (60.2%), and dyslipidemia (66.4%). Ischemic cardiomyopathy (51.3%) and hypertensive heart disease (60.2%) were the leading etiologies. Physical signs included leg edema (83.2%) and elevated JVP (59.3%). Thyroid dysfunction was present in 20.4% of cases. Conclusion: This Bangladeshi heart failure cohort predominantly showed reduced ejection fraction with significant cardiometabolic comorbidities. The findings emphasize the need for focused prevention and management of ischemic and hypertensive heart disease in similar settings.***

***Keywords: Bangladesh, Clinical profile, Community hospital, Heart failure, Prospective study***

**INTRODUCTION**

Heart failure (HF) represents a major global health burden, affecting approximately 64 million people worldwide, with a particularly high prevalence in low- and middle-income countries (LMICs) like Bangladesh [1]. The condition is characterized by high morbidity, mortality, and healthcare costs, making it a critical public health challenge [2,3]. In Bangladesh, the rising prevalence of cardiovascular risk factors, including hypertension, diabetes, and ischemic heart disease, has contributed to an increasing incidence of HF, yet data on its clinical presentation in community-based hospital settings remain limited [4,5]. The clinical presentation of HF varies significantly across different populations and healthcare settings. While international guidelines provide standardized diagnostic and management approaches, regional variations in etiology, comorbidities, and healthcare access necessitate localized data for optimal patient care [6,7]. For instance, studies from South Asia have highlighted a higher burden of hypertensive and ischemic heart disease as underlying causes of HF compared to Western populations, where non-ischemic cardiomyopathies are more prevalent [8,9]. Additionally, socioeconomic factors, late presentation, and limited access to advanced therapies further complicate HF management in resource-limited settings like Bangladesh [10]. Community-based hospitals in Bangladesh serve as primary referral centers for HF patients, yet there is a paucity of prospective studies describing their clinical profiles. Most existing data come from tertiary care centers in urban areas, which may not reflect the realities of smaller hospitals serving rural populations [11,12]. Understanding the demographic characteristics, symptom patterns, and etiological spectrum of HF in these settings is crucial for developing tailored prevention and treatment strategies [13]. This study aimed to prospectively evaluate the clinical presentation of HF patients admitted to Community-Based Medical College Hospital, a tertiary care facility in Mymensingh, Bangladesh. Specifically, this study aimed to describe the demographic and clinical characteristics of heart failure patients, identify common comorbidities and underlying etiological factors, and document the prevalence of key symptoms and signs at presentation among patients admitted to the study facility. By addressing these objectives, our findings will contribute to the limited body of literature on HF in Bangladeshi community hospitals and inform local healthcare policies. Furthermore, the results may help clinicians in similar settings recognize typical HF presentations early, initiate appropriate management, and reduce preventable complications [14,15].

**METHODOLOGY**

**This prospective cross-sectional study was conducted at Community-Based Medical College Hospital, Mymensingh, Bangladesh, from January 2022 to December 2023. We purposively recruited 113 consecutive adult patients (age ≥18 years) admitted with a primary diagnosis of heart failure, as defined by the 2021 ESC Guidelines [16]. Data were collected through face-to-face interviews using a structured questionnaire, comprehensive physical examinations, and review of medical records. Trained cardiologists performed echocardiographic assessment to determine ejection fraction and cardiac structural abnormalities. Demographic variables (age, sex), clinical parameters (vital signs, NYHA functional class), comorbidities (hypertension, diabetes), and physical findings (edema, jugular venous distension) were systematically recorded. Laboratory investigations included complete blood count, renal function tests, and thyroid profile. Data analysis was performed using Microsoft Excel 2019, with categorical variables presented as frequencies/percentages and continuous variables as mean±SD.**

**RESULT**

The study included 113 heart failure patients with a mean age of 62.4 ± 11.3 years, showing a male predominance (75.2%). The majority of patients (81.4%) presented with reduced ejection fraction (≤40%), while 18.6% had preserved ejection fraction (>40%). Cardiovascular symptoms were nearly universal, with shortness of breath reported by 96.5% of participants. Orthopnea affected 86.7% of cases, while paroxysmal nocturnal dyspnea was present in 77.0%. Physical examination revealed bilateral basal crepitations in 92.9% of patients, with peripheral edema observed in 83.2% and elevated jugular venous pressure in 59.3%. Comorbidities were highly prevalent, including diabetes mellitus (72.6%), hypertension (60.2%), and dyslipidemia (66.4%). Atrial fibrillation was documented in 43.4% of cases. The primary etiologies were ischemic cardiomyopathy (51.3%) and hypertensive heart disease (60.2%). Thyroid dysfunction was present in 20.4% of patients, with hypothyroidism (12.4%) being more common than hyperthyroidism (8.0%). Hemodynamic parameters showed that 78.8% of patients had systolic blood pressure below 116 mmHg, while 84.1% had diastolic blood pressure under 75.77 mmHg. Tachycardia (heart rate ≥85 bpm) was observed in 69.9% of the cohort. These findings demonstrate a characteristic pattern of congestive heart failure with significant metabolic comorbidities in this Bangladeshi population.

***Figure 1:*** *Distribution of age (N=113)*

***Figure 2:*** *Distribution of gender*

**Table 1:** Clinical and hemodynamic parameters

|  |  |  |  |
| --- | --- | --- | --- |
| Parameter | Category | n | % |
| Ejection Fraction (EF) | ≤40% (HFrEF) | 92 | 81.4% |
| >40% (HFpEF/HFmrEF) | 21 | 18.6% |
| Systolic BP | <116 mmHg | 89 | 78.8% |
| ≥116 mmHg | 24 | 21.2% |
| Diastolic BP | <75.77 mmHg | 95 | 84.1% |
| ≥75.77 mmHg | 18 | 15.9% |
| Pulse Rate | <85 bpm | 34 | 30.1% |
| ≥85 bpm | 79 | 69.9% |

**Table 2:** Comorbidities among patients (N=113)

|  |  |  |
| --- | --- | --- |
| Comorbidity | n | % |
| Hypertension | 68 | 60.2% |
| Diabetes Mellitus | 82 | 72.6% |
| Dyslipidemia | 75 | 66.4% |
| Atrial Fibrillation | 49 | 43.4% |
| Chronic Ischemic HD | 52 | 46.0% |
| Valvular Heart Disease | 15 | 13.3% |

***Figure 3:*** *Symptom prevalence*

**Table 3:** Etiology of heart failure

|  |  |  |
| --- | --- | --- |
| Etiology | n | % |
| Ischemic Cardiomyopathy | 58 | 51.3% |
| Dilated Cardiomyopathy | 22 | 19.5% |
| Hypertensive Heart Disease | 68 | 60.2% |
| Valvular Heart Disease | 15 | 13.3% |
| Postpartum Cardiomyopathy | 5 | 4.4% |

***Figure 4:*** *Thyroid dysfunction in patients*

**DISCUSSION**

This prospective study provides important insights into the clinical presentation of heart failure patients in a Bangladeshi community hospital setting. Our findings reveal several key patterns that warrant discussion in the context of both regional and global heart failure epidemiology. The demographic profile of our cohort, with a mean age of 62.4 years and male predominance (75.2%), aligns with previous reports from South Asia [12,17] but contrasts with Western populations where heart failure typically presents at older ages [18]. This difference may reflect regional variations in cardiovascular risk factor distribution and life expectancy. The high prevalence of reduced ejection fraction (81.4%) in our study is particularly notable, exceeding rates reported in many international registries [19]. This finding suggests that patients in our setting may present at more advanced disease stages, possibly due to delayed healthcare access or differences in underlying etiologies. The symptom profile observed - with dyspnea (96.5%), orthopnea (86.7%), and crepitations (92.9%) being nearly universal - demonstrates the classic congestive picture of heart failure in this population. These rates are substantially higher than those reported in some international studies [20], potentially indicating more severe clinical presentations at the time of hospitalization. The frequent physical findings of edema (83.2%) and elevated JVP (59.3%) further support this interpretation and emphasize the fluid overload state characteristic of decompensated heart failure in our cohort. The comorbidity burden we documented, particularly the high rates of diabetes (72.6%) and hypertension (60.2%), exceeds global averages [21] and mirrors patterns seen in other Bangladeshi studies [15]. This metabolic risk factor clustering likely contributes significantly to both the development and progression of heart failure in this population. The predominance of ischemic cardiomyopathy (51.3%) and hypertensive heart disease (60.2%) as etiologies contrasts with data from high-income countries, where non-ischemic causes are more common [22], highlighting important regional differences in disease pathophysiology. Several findings from our study have important clinical implications. First, the high prevalence of uncontrolled metabolic comorbidities suggests opportunities for improved primary and secondary prevention strategies. Second, the predominance of volume overload signs indicates potential benefits from more aggressive diuretic protocols and patient education about fluid management. Third, the frequent coexistence of atrial fibrillation (43.4%) underscores this population's need for better anticoagulation practices. The hemodynamic parameters we observed, particularly the predominance of lower blood pressures (systolic BP <116 mmHg in 78.8%) and tachycardia (69.9%), may reflect both the severity of presentations and the high proportion of reduced ejection fraction cases. These findings have therapeutic implications, as they suggest many patients might tolerate and benefit from guideline-directed medical therapy, including beta-blockers and ACE inhibitors [23].

**Limitations:**

This study has several limitations, including its single-center design, which may affect generalizability, and the use of purposive sampling, which could introduce selection bias. Additionally, the lack of long-term follow-up data and advanced biomarkers limits our ability to assess prognostic outcomes and more nuanced pathophysiological insights.

**CONCLUSION**

This study reveals that heart failure patients in a Bangladeshi community hospital predominantly present with reduced ejection fraction, severe congestive symptoms, and high cardiometabolic comorbidities. The findings underscore the urgent need for improved prevention and management strategies targeting ischemic and hypertensive heart disease in resource-limited settings, where late presentations and complex risk factor burdens challenge optimal care delivery.

**Recommendation:**

To address these findings, we recommend implementing community-based screening programs for early heart failure detection, strengthening primary prevention of metabolic risk factors, and developing tailored management protocols for resource-limited settings. Additionally, enhancing patient education on symptom recognition and prioritizing research on context-specific treatment strategies could significantly improve outcomes in similar populations.

Disclaimer (Artificial intelligence)

Author(s) hereby declare that NO generative AI technologies such as Large Language Models (ChatGPT, COPILOT, etc) and text to image generators have been used during writing or editing of this manuscript.

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