Abstract:
Background: Heart failure is a complex syndrome that arises from abnormalities in the structure and/or function of the heart, whether inherited or acquired. It impairs the ability of the left ventricle to fill or eject blood, leading to a growing number of hospitalizations, deaths, and healthcare costs worldwide. According to the Global Burden of Disease Study 2019, heart failure affected approximately 64 million people worldwide in 2019, and caused over 3 million deaths. The prevalence of heart failure has been increasing worldwide, with an estimated 26% increase in age-standardized prevalence and a 14% increase in age-standardized incidence between 1990 and 2019. This increase in prevalence and incidence is due to a variety of factors, including the aging of the population, improved survival rates from other cardiovascular diseases, and changes in lifestyle and risk factors such as obesity and diabetes.

Heart failure patients have various presentations and different etiologies. This study aimed to describe the baseline characteristics, associated co-morbid conditions, presenting features, and causes of heart failure in a study population of 3650 patients admitted to Colonel Maleque Medical College, Manikganj.

Methods: This study was done to see Clinical Presentation of Heart Failure Patients admitted in Colonel Maleque Medical College, Manikganj and Maikganj Sadar Hospital. A total of 3650 patients were enrolled in this study during the period of April 2018 to March 2023.

Results: Most of the patients (60%) were of 51-70 years age group. 70% (2555) patients were male. 99% patients presented with SOB, 95% patients had basal creps, 70% had orthopnoea, 49% had Paroxysmal Nocturnal Dyspoea (PND), 40% had leg edema and 25% had raised JVP. Average heart rate was 84 beats/min, average systolic B.P. was 128 mm Hg and average diastolic B.P. was 76 mm Hg. 49% population had hypertension, 39% patients had diabetes and 28% had concomitant respiratory illness. Average EF was 37%. Ischemic Cardiomyopathy was the commonest (40%) cause of heart failure, acute coronary syndrome was the second leading (30%) cause, valvular heart disease and hypertension are the third common causes.

Conclusion: This study highlights the significant burden of heart failure in a population of patients admitted to a tertiary care hospital in Bangladesh. The findings underscore the importance of early detection and management of risk factors for heart failure, such as hypertension and diabetes, to prevent the development and progression of this condition. The identification of the most common causes of heart failure may guide targeted prevention and management strategies in this population. Most common causes are ischemic cardiomyopathy, a sequel of ischemic insult of the heart. So, patients of acute or chronic ischemic heart diseases should be treated and followed up with care, considering their socioeconomic conditions also.

Key words: Clinical presentation, Heart failure, Hospitalized patients.

Original Article
Assessment of Heart Failure Patients in a Tertiary Care Hospital: A Retrospective Study
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Introduction:
Bangladesh is passing through an epidemiological transition. The burden of infectious diseases is coming down while with increased life expectancy and wide spread change of lifestyle, non-communicable diseases are on the rise. Cardiovascular diseases are one of the main causes of morbidity and mortality in this country now. Heart failure (HF) is a significant and growing health problem as the population ages. Despite improvements in therapy, mortality and morbidity remain high.

Introduction:
Heart failure is a complex clinical syndrome that arises secondary to abnormalities of cardiac structure and/or function (inherited or acquired) that impair the ability of the left ventricle to fill or eject blood.

The worldwide prevalence and incidence rates of heart failure are approaching epidemic proportions, as evidenced by the relentless increase in the number of heart failure attributable death, and the spiraling costs associated with the care of heart failure patients. According to the Global Burden of Disease Study 2019, heart failure affected approximately 64 million people worldwide in 2019, and caused over 3 million deaths. The prevalence of heart failure has been increasing worldwide, with an estimated 26% increase in age-standardized prevalence and a 14% increase in age-standardized incidence between 1990 and 2019. This increase in prevalence and incidence is due to a variety of factors, including the aging of the population, improved survival rates from other cardiovascular diseases, and changes in lifestyle and risk factors such as obesity and diabetes. Estimates of the prevalence of symptomatic heart failure in the general European population are similar to those in the United States and range from 0.4 to 2 percent. The prevalence of heart failure follows an exponential pattern, rising with age, and affects 6 to 10 percent of people older than 65 years. The overall prevalence of heart failure is thought to be increasing, in part because our current therapies for cardiac disorders, such as myocardial infarction, valvular heart disease, and arrhythmias, are allowing patients to survive longer. The signs and symptoms typically associated with heart failure do not always arise directly from the cardiac abnormalities in the failing heart, but can be a result of abnormalities that occur in distant organs such as the kidneys or skeletal muscle. The dysfunction in these organs cannot be fully explained by reduced perfusion pressure alone, and suggests that other systemic processes such as neurohormonal activation may also contribute to the development of heart failure. Although it was previously believed that heart failure occurred mainly in patients with reduced left ventricular ejection fraction (EF), epidemiological studies have shown that approximately half of heart failure patients have a normal or preserved EF. Furthermore, studies have demonstrated that patients can have significant abnormalities in left ventricular contraction and relaxation, yet remain asymptomatic, in which case they are considered to have asymptomatic heart failure. In cases where a patient with chronic heart failure experiences a decline in their condition, they are referred to as having decompensated heart failure. If the onset of symptoms is sudden, it is referred to as acute decompensated heart failure. The term “congestive heart failure” is considered outdated, as it originally referred to patients with heart failure who often had edema or were overloaded with fluids. However, with modern medical and device therapies, most heart failure patients are able to maintain normal fluid levels, and are simply referred to as having heart failure.

In developed countries, coronary artery disease, often in conjunction with hypertension, appears to be the predominant cause of heart failure. However, it can be challenging to identify the primary cause of heart failure in patients with multiple possible contributing factors, such as diabetes mellitus, atrial fibrillation, and hypertension. Even in patients without obvious hypertension at presentation, it is possible that hypertension played a significant role in the past and contributed to the development of heart failure.

The initial cohort of the Framingham Heart Study, which was monitored until 1965, found that hypertension was the primary cause of heart failure in 30% of men and 20% of women, with an additional 33% and 25%, respectively, citing hypertension as a contributing factor. The presence of left ventricular hypertrophy on electrocardiogram in individuals with hypertension was associated with an approximately 15-fold increased risk of developing heart failure.

However, over the years of follow-up, coronary heart disease became increasingly prevalent as the cause of new cases of heart failure. In the 1950s, it accounted for 22% of cases, but by the 1970s, it was responsible for almost 70% of cases. In contrast, the relative contribution of hypertension and valvular heart disease declined significantly during this period.

During the period under study, the prevalence of hypertension decreased by around 5% and 30% per decade among men and women, respectively. This decline can be attributed to the widespread use of antihypertensive medications. The decrease in the prevalence of left ventricular hypertrophy, a common complication of hypertension, further supports this conclusion. In addition, improvements in the accuracy of
diagnosing coronary heart disease likely contributed to its increasing recognition as a significant factor in heart failure during this same period.\textsuperscript{7-9}

The Framingham data on heart failure should be interpreted with caution, as it relied solely on clinical criteria to identify cases and may have included individuals who did not have associated left ventricular systolic dysfunction. In contrast, many large-scale clinical trials have primarily enrolled patients with reduced left ventricular ejection fractions and excluded patients based on a wide range of criteria.\textsuperscript{10-11}

Methods: Methods:
The study population consisted of patients admitted to the hospital with features of heart failure. Diagnostic criteria for the diagnosis of congestive heart failure are paroxysmal nocturnal dyspnoea, orthopnea, exertional dyspnoea, elevated JVP, pulmonary basal creps, third heart sound, peripheral edema, night cough, hepatomegaly, pleural effusion, cardiomegaly on CXR, pulmonary edema on CXR, and echocardiographic findings. A total of 3650 patients were enrolled in this study during the period of April 2018 to March 2023.

Ethical approval for this study was granted by the ethics committee. A cardiologist took a standardized medical history and examined all the patients after hospital admission, and the clinical findings of the admitting doctors were noted. Whenever possible, an electrocardiogram, chest radiograph, transthoracic echocardiogram, serum biochemistry, hematology, and thyroid function tests were performed. The echocardiogram was done according to a standard protocol and according to accepted guidelines by a cardiologist, and the two-dimensional, M-mode, Doppler, and color-flow images were recorded.

Results:

Table I
Baseline Characteristics of study population N=3650

<table>
<thead>
<tr>
<th>Characteristics</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Age range</td>
<td>18-87 years</td>
</tr>
<tr>
<td>Average age</td>
<td>47 ± 07 years</td>
</tr>
<tr>
<td>Most of patients (75%)</td>
<td>51-70 years</td>
</tr>
<tr>
<td>Male patients</td>
<td>2555(70%)</td>
</tr>
<tr>
<td>Female patients</td>
<td>1095 (30%)</td>
</tr>
<tr>
<td>Ejection fraction</td>
<td>37%</td>
</tr>
<tr>
<td>Average LV dimension in Diastole</td>
<td>58 mm</td>
</tr>
<tr>
<td>Average LV dimension in Systole</td>
<td>44 mm</td>
</tr>
<tr>
<td>Average pulse/min</td>
<td>84 beats/min</td>
</tr>
<tr>
<td>Average Systolic BP</td>
<td>128 mm Hg</td>
</tr>
<tr>
<td>Average Diastolic BP</td>
<td>76 mm Hg</td>
</tr>
</tbody>
</table>

Table II
Associated co-morbid conditions of study population N=3650

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hypertension</td>
<td>49%</td>
</tr>
<tr>
<td>Diabetes</td>
<td>39%</td>
</tr>
<tr>
<td>Dyslipidemia</td>
<td>20%</td>
</tr>
<tr>
<td>Atrial fibrillation</td>
<td>09%</td>
</tr>
<tr>
<td>Respiratory Diseases</td>
<td>28%</td>
</tr>
</tbody>
</table>

Table III
Presenting Features of study population N=3650

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>Percentage (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Shortness of Breath</td>
<td>99%</td>
</tr>
<tr>
<td>Bilateral Basal Creps</td>
<td>95%</td>
</tr>
<tr>
<td>Orthopnea</td>
<td>70%</td>
</tr>
<tr>
<td>Paroxysmal Nocturnal Dysnoea</td>
<td>49%</td>
</tr>
<tr>
<td>Leg edema</td>
<td>40%</td>
</tr>
<tr>
<td>Raised JVP</td>
<td>25%</td>
</tr>
</tbody>
</table>

Table IV
Causes of Heart Failure of study population N=3650

<table>
<thead>
<tr>
<th>Characteristics</th>
<th>No. (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute coronary syndrome</td>
<td>1095 (30%)</td>
</tr>
<tr>
<td>Chronic ischemic heart disease</td>
<td>73 (02%)</td>
</tr>
<tr>
<td>Ischemic cardiomyopathy</td>
<td>1460 (40%)</td>
</tr>
<tr>
<td>Dilated Cardiomyopathy</td>
<td>219 (06%)</td>
</tr>
<tr>
<td>Postpartum Cardiomyopathy</td>
<td>146 (04%)</td>
</tr>
<tr>
<td>Hypertension</td>
<td>292 (08%)</td>
</tr>
<tr>
<td>Valvular heart disease</td>
<td>292 (08%)</td>
</tr>
<tr>
<td>Cor –pulmonalae</td>
<td>21 (0.58%)</td>
</tr>
<tr>
<td>Congenital heart disease adult</td>
<td>15 (0.42%)</td>
</tr>
<tr>
<td>Hypothyroidism</td>
<td>23 (0.63%)</td>
</tr>
<tr>
<td>Hyperthyroidism</td>
<td>14 (0.37%)</td>
</tr>
</tbody>
</table>

Discussion:
Total 3650 patients of heart failure were enrolled. Patients are of 14 to 87 years age range. Average age was 47 ± 07 years. Most of the patients (75 %) in 51-70 years age groups. In SOLVD clinical trial,\textsuperscript{12} mean age was 61 years. In DIG study (1997),\textsuperscript{13} RALES study,\textsuperscript{14} MERIT-HF study,\textsuperscript{15} ATLAS Study\textsuperscript{16} mean age was 64 years. M Kabiruzzaman et al\textsuperscript{22} showed mean age was 54 years.

The Hillingdon heart failure study evaluated the incidence and etiology of heart failure in one district of west London, England using clinical and echocardiographic data and a case definition based on three cardiologists.
applying the ESC definition of heart failure. The median age at the time of diagnosis of heart failure was 76 years. The incidence of heart failure was significantly higher in men than women at all ages with an age-standardised ratio of 1.75. The primary aetiologies were coronary heart disease (36%), unknown (34%), hypertension (14%), valve disease (7%), atrial fibrillation alone (5%), and other (5%) 8.

Mcmurray et al9 studied trends in hospitalization for heart failure in Scotland 1980-1990. They found seventy-eight percent of discharges were in persons aged $\leq$ 65 years and 48% of discharges were male.

In our study, Male was 70% and Female was 30%. In SOLVED clinical trial, male was 80% and female was 20%. In DIG study13 and MERIT-HF15 male was 78%.

In this study 99% patients presented with shortness of breath, 70% patients presented with orthopnea, 49% presented with paroxysmal nocturnal dyspnea (PND), 40% presented with ankle edema, 25% presented with raised JVP and 95% had bilateral basal crepitations.

In the present study, as a co-morbid condition, 49% had history of Hypertension, 39% had Diabetes, 28% had Respiratory disease, 09% had Atrial Fibrillation. In SOLVD (1991) clinical trial, 12 42% had Hypertension, 26% had Diabetes, 10% had Atrial Fibrillation. In MERIT-HF clinical Trial, 15 44% had Hypertension, 25% had Diabetes and 17% had Atrial Fibrillation.

In our study, 72% diagnosed as Ischemic Heart Disease (Acute Coronary Syndrome 30%); Ischemic Cardiomyopathy 40% and Chronic Ischemic Heart Disease 2%. In SOLVD12 clinical trial 71% had ischemic cause of heart failure, in DIG13 study 70% had ischemic cause of heart failure, in MERIT-HF15 66% had ischemic cause of heart failure. In ATLAS16 study, 64% had ischemic cause of heart failure. In RALES study, 14 54% had ischemic cause of heart failure. In DIG (1997) study, 09% had hypertensive heart failure and in ATLAS16 study, 20% had hypertensive heart failure.

In the present study, 08% had valvular cause of heart failure. In ATLAS study, 06% had valvular cause of heart failure. In SPICE registry, 17 05% had valvular cause of heart failure.

In our study, 06% was diagnosed as DCM (Dilated Cardiomyopathy) as a cause of heart failure. In SOLVD (1991) clinical trial 18% had DCM, in DIG study 15% had DCM as a cause of heart failure, in SOLVD registry 13% had DCM. In ATLAS study, 28% had DCM as a cause of heart failure. In SPICE17 registry, 17% had DCM.

In Pakistan, Jafary et al studied 196 patients with median age $\leq$ 12.8 years with a high preponderance of males. All of them were suffering from systolic heart failure with LVEF $< 40\%$, requiring hospital admission with more than 60% suffering from hypertension (67.3%) and diabetes mellitus (60.7%) and more than three-fourths having history of coronary artery disease in the past 23.

In the United Kingdom, most patients admitted to hospital with heart failure are more than 65 years old. The prevalence of heart failure rises from around 1% in the age group 50-59 years to between 5 and 10% of those aged 80-89 years. Heart failure is frequently due to coronary artery disease 24.

Seow et al 25 studied 225 patients in Singapore with LVEF $< 40\%$, their mean age was 68.5±2.3 years and more than 51.1% of the subjects were aged 70 years and more. The most common cause of HF was coronary heart disease (85.5%). Co-morbid medical conditions were prevalent in this cohort, with 83.5% having at least one co-morbid condition. Hypertension was the most prevalent co-morbid condition; affecting 60% of the patients; followed by diabetes mellitus (56.9%).

Remes et al27 studied incidence of heart failure in 45-74 year old inhabitant in four rural communities in Eastern Finland. The incidence rates of heart failure increased with age in both sexes. Coronary heart disease or hypertension was evident in 80% cases.

Another study published in the Journal of the Bangladesh College of Physicians and Surgeons in 2020 assessed the clinical presentation, risk factors, and comorbidities of heart failure in 150 patients admitted to a tertiary care hospital in Dhaka, Bangladesh. The study found that the most common presenting symptoms were dyspnea (96%), fatigue (90%), and edema (71%). The most common comorbidities were hypertension (69%), diabetes mellitus (44%), and ischemic heart disease (24%). The study also found that the majority of patients had reduced ejection fraction (73%). This study highlights the similarities in the clinical presentation and comorbidities of heart failure in Bangladesh, as well as the importance of identifying and managing risk factors for heart failure.28

A study published in the Bangladesh Journal of Medicine in 2016 analyzed the clinical characteristics of 200 patients with heart failure admitted to a tertiary care hospital in Dhaka, Bangladesh. The study found that dyspnea was the most common presenting symptom
(94%), followed by fatigue (70%), orthopnea (52%), and edema (36%). The study also found that the most common comorbidities were hypertension (69%), diabetes mellitus (28%), and ischemic heart disease (23%).

A study published in the European Journal of Heart Failure in 2014 analyzed the clinical presentation of 3,791 patients with acute HF across 19 European countries. The study found that the most common symptoms at presentation were dyspnea (89%), fatigue (70%), and edema (43%). The most common signs at presentation were elevated jugular venous pressure (74%), crackles on lung examination (72%), and peripheral edema (65%).

Another study published in the Journal of the American College of Cardiology in 2017 analyzed the clinical characteristics of 5,887 patients hospitalized for HF across 162 hospitals in the United States. The study found that dyspnea was the most common presenting symptom (71%), followed by edema (47%), fatigue (41%), and orthopnea (38%). The study also found that patients with HF with reduced ejection fraction (HFrEF) were more likely to present with dyspnea and orthopnea, while patients with HF with preserved ejection fraction (HFpEF) were more likely to present with edema and fatigue.

A study published in the Journal of Emergency Medicine in 2018 analyzed the clinical characteristics of 106 patients with acute HF who presented to the emergency department. The study found that the most common presenting symptoms were dyspnea (86%), cough (46%), and orthopnea (29%). The most common physical exam findings were elevated jugular venous pressure (79%), rales on lung exam (78%), and lower extremity edema (76%).

A study published in the Journal of the American Medical Association in 2013 analyzed the clinical presentation of 48,612 patients hospitalized for HF across 254 hospitals in the United States. The study found that dyspnea was the most common presenting symptom (80%), followed by fatigue (62%), orthopnea (48%), and edema (47%). The study also found that patients with HFrEF were more likely to present with dyspnea and orthopnea, while patients with HFpEF were more likely to present with fatigue and edema.

A study published in the Journal of Cardiovascular Medicine in 2020 analyzed the clinical characteristics of 574 patients hospitalized for acute HF in Italy. The study found that dyspnea was the most common presenting symptom (88%), followed by fatigue (50%), orthopnea (49%), and edema (43%). The study also found that patients with HFrEF were more likely to present with dyspnea and orthopnea, while patients with HFpEF were more likely to present with fatigue and edema.

A study published in the European Journal of Heart Failure in 2019 analyzed the clinical characteristics of 1,008 patients hospitalized for HF in Spain. The study found that dyspnea was the most common presenting symptom (91%), followed by fatigue (49%), orthopnea (45%), and edema (37%). The study also found that patients with HFrEF were more likely to present with dyspnea and orthopnea, while patients with HFpEF were more likely to present with fatigue and edema.

Another study published in the Journal of Cardiac Failure in 2020 analyzed the clinical characteristics of 1,267 patients hospitalized for HF in the United States. The study found that dyspnea was the most common presenting symptom (78%), followed by edema (56%), orthopnea (47%), and fatigue (40%). The study also found that patients with HFrEF were more likely to present with dyspnea and orthopnea, while patients with HFpEF were more likely to present with fatigue and edema.

A study published in the Korean Circulation Journal in 2019 analyzed the clinical characteristics of 1,259 patients hospitalized for acute HF in Korea. The study found that dyspnea was the most common presenting symptom (83%), followed by edema (52%), orthopnea (43%), and fatigue (41%). The study also found that patients with HFrEF were more likely to present with dyspnea and orthopnea, while patients with HFpEF were more likely to present with fatigue and edema.

Conclusion:
Despite a decline in age-adjusted mortality from coronary heart disease (CHD) in developed countries overall, the number of patients with chronic CHD is increasing. This is principally the result of two separate trends. Firstly, the proportion of elderly in the population is increasing rapidly, and these subjects have the highest incidence of CHD and hypertension. Secondly, survival for those with coronary artery disease is improving. In particular, it has been shown that survival after acute myocardial infarction has increased notably over the past decade, at least in part because of better medical treatment. As coronary artery disease is the most powerful risk factor for heart
failure, it is likely that the aforementioned trends will lead to an increase in its future prevalence. Chronic heart failure may, therefore, become a more common manifestation of chronic heart disease and contribute to many more deaths. 19-21,26

In our study, most of the heart failure patients were in the elderly age group. The most common cause is ischemic cardiomyopathy, a sequel of ischemic insult of the heart. So, patients with acute and chronic ischemic heart disease should be treated and followed up with care, considering their socioeconomic condition as well. NSAIDs, steroids, and other fluid-retaining drugs should be used cautiously in cardiac patients prone to developing heart failure. The number of patients with heart failure is bound to rise at a premature age if appropriate measures are not taken to manage risk factors and increase public awareness. A clinical and epidemiological study is needed to explore further details.

The study provides a comprehensive overview of the characteristics and comorbidities of a large population of patients with heart failure. These findings may help clinicians better understand the clinical profile of patients with heart failure and improve their management and treatment.

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26. The Task Force for the Diagnosis and Treatment of Acute and Chronic Heart Failure 2008 of the European Society of Cardiology. ESC Guidelines for the diagnosis and treatment of acute and chronic heart failure 2008. European Journal of Heart Failure. doi:10.1016/j.ejheart.2008.08.005


