

Burden of Heart Failure Patients in a Tertiary Level Cardiac Hospital

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Summary:

Objective: Heart failure (HF) has become an increasingly frequent cause of hospital admission and carries a poor prognosis. There is a paucity of data in Indo-Asians particularly in Bangladesh on characteristics of heart failure patients. The purpose of this study was to determine the etiological factors and co-morbidity of hospitalized heart failure patients.

Method: A hospital based cross sectional study was done at a tertiary cardiac hospital in Dhaka city. Hospital medical records of 14009 patients admitted between January 2005 and August 2006 were reviewed and 1970 patients with the diagnosis of HF were identified. Relevant etiological information and socio demographic data were abstracted from the hospital record files.

Result: About one-seventh of total hospital admitted patient had HF. Mean age (SD) was 54.1 (15.3) years.

Introduction:

Bangladesh is passing through an epidemiological transition. Burden of infectious diseases are coming down while with increased life expectancy and wide spread change of lifestyle, non-communicable diseases are on the rise¹. Cardiovascular diseases are one of

Majority (35.79%) had ischaemic heart disease (IHD) as the principal etiological factor but this frequently co-existed with a history of hypertension (46.8%). Hypertension was considered the primary risk factor of HF in 29.14% of cases. Hypertension alone and in co-existence with other etiology was found in 48.07% (947) cases. Diabetes Mellitus (DM) co-existed with IHD in 41.4% (292) and it (32.64%) was found more prevalent in Dilated Cardiomyopathy (DCM) patient with HF.

Conclusions: The mean age of hospitalized HF patients is remarkably lower than other related studies done abroad. The single most common etiology for HF is ischemic heart disease in this population. Hypertension is the most common risk factor. Measures to prevent ischaemic heart disease and control of risk factors are essential to prevent premature onset of HF.

(J Bangladesh Coll Phys Surg 2010; 28: 24-29)

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Received: 22 April, 2009

Accepted: 11 September, 2009

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 high². In the United Kingdom, most patients admitted to hospital with HF are more than 65 years old and remain inpatients for a week or more. 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 years³. Heart failure is frequently due to coronary artery disease, tends to affect elderly people and often leads to prolonged disability. Although the outlook depends to some extent on the underlying cause of the problem, heart failure carries a very poor prognosis, approximately 50% of patients with severe HF due to severe left ventricular dysfunction will die within 2 years³. Hospitalized heart failure is regarded as prognostically more adverse with a high mortality and readmission rate. However, there is a paucity of data on outcomes of heart failure in particular in Indo-Asians⁴.

There is an ever increasing number of hospital admissions due to heart failure in different hospitals

in Bangladesh, however there is a paucity of data on characteristics of the patients in terms of demographic and etiological information. It is important to identify the etiological factors associated with HF in this population to determine strategy for prevention and early detection. In this study we sought to determine the disease burden of heart failure patients and the age and sex specific prevalence of heart failure among patients admitted into NHFH&RI and to identify the etiological pattern of diseases leading to heart failure with associated co-morbid factors.

Materials & Method:

Settings: This was a single center cross sectional study carried out at National Heart Foundation Hospital & Research Institute (NHFH&RI), a tertiary teaching hospital in Dhaka, Bangladesh. This centre receives a mixture of affluent and low-middle income patients and serves the entire country as a referral center for patients requiring high-intensity tertiary care.

The hospital medical records from January 2005 to August 2006 were searched & all patients suffering from heart failure were included in this study. Variables recorded includes age, sex, history of Diabetes Mellitus (DM) (defined as a fasting glucose ≥ 126 mg/dl or on treatment), Hyperlipidemia (fasting cholesterol ≥ 200 mg/dl or on treatment), hypertension (blood pressure $\geq 140/90$ mmHg or on treatment). Associated co-morbidity were classified into some major group of heart diseases: old myocardial infarction (OMI), acute coronary syndrome (ACS), dilated cardiomyopathy (including ischaemic and other causes), valvular heart diseases, hypertensive heart disease, congenital heart diseases. Among the ACS were acute myocardial infarction (AMI), recent myocardial infarction (RMI), and unstable angina (UA).

Coronary artery disease was considered the primary aetiology if the patient had a documented history of myocardial infarction (acute or in the past); unstable angina pectoris; a history of stable angina ; or coronary artery disease confirmed at coronary angiography. Such cases were subdivided into those with acute cardiac ischaemic syndromes (acute myocardial infarction or unstable angina pectoris), and those without. Hypertension was considered the

aetiology if there was a history of hypertension from the general practice records or sustained hypertension (blood pressure greater than 140/90 mmHg) during hospital admission and there was no documented history of myocardial infarction or angina, and no evidence of other cardiac pathology. The presence and severity of underlying valvular heart disease was assessed from the history, clinical examination and echocardiographic findings. The presence of cardiac arrhythmias was noted and the temporal relationship of these to the development of heart failure ascertained. Data were checked for completeness and consistencies. The descriptive statistics were analysed with SPSS for windows version 12.5.

Results:

Among 14,009 total admitted patients throughout this period 1970 patients were found to have a diagnosis of heart failure ie 14.1% of totally admitted patients had heart failure. The mean age of these patients were 54.1 ± 15.3 years ranging from 1 to 95 years with a high preponderance of males. The majority of the patient population was in the age group of 51- 60 years (30.7%) (Table I). 71.7% of the cases were male & 28.3% female by gender specification. Chronic heart failure patients were more prevalent among the patient population (71.3% chronic Vs 28.7% acute). Coronary artery disease was found to be the common cause of heart failure in adult population (n=705, 35.79%).

Majority of the ACS patients were diagnosed as AMI (n=400, 20.3%). Among total study population, 49.4% (n=974) patients were hypertensive and 18.8% (n=371) patients were diabetic. 29.14% (n=574) patients had hypertensive heart disease leading to heart failure. The patients with heart failure having coronary artery disease (n=705) had hypertension (n=330, 46.8%) as the most prevalent major risk factor; diabetes was found to be second common co-morbid factor. Patients with dilated cardiomyopathy (n=242) had DM (n=79; 32.64%) as most prevalent comorbid factor. Among the congenital heart diseases, ventricular septal defect (VSD) and patent ductus arteriosus (PDA) were most common cause of heart failure needing hospitalization (Table 2).

Mortality rate of the study population were 9.7% and was higher among males (10.6% vs. 7.7%) than females.

Table-I*Age and Sex distribution of heart failure patients admitted in NHFH&RI from January 2005 to August 2006 (n=1970)*

Age group (years)	Number	%
≤30	169	8.6
31- 40	204	10.4
41- 50	389	19.5
51- 60	604	30.7
61- 70	388	19.7
71- 80	165	8.4
≥81	51	2.6
Sex	Number	%
Male	1413	71.7
Female	557	28.3

Table-II*Distribution of study population by their etiological disease pattern & associated co-morbid factors (n=1970)*

Morbidity type	No. of cases	(%)	Co-morbid Factors	
			HTN	DM
CAD	705	35.75	330(46.8%)	292(41.4%)
Old MI	305		150	125
AMI	305		78	75
RMI	82		27	36
UA	114		75	56
Hypertensive heart disease	547	29.14		
Dilated cardiomyopathy	242	12.28	70 (28.93%)	79 (32.64%)
Valvular heart disease	437	22.18		
Others	12	0.6		

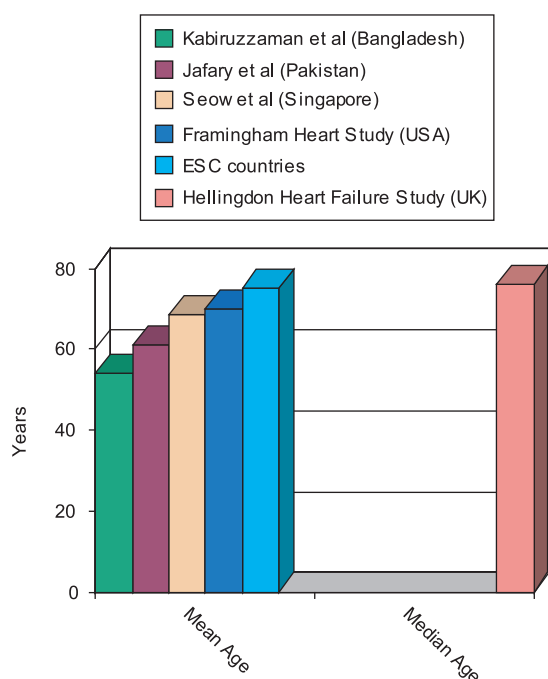
Table-III*Comparison of etiological factors in different studies in different territories*

Etiology	Teerlink et al, 31 studies, 1989 – 90 15	Framingham Heart Study 15 USA		Hillingdon Study 5,15 West London	NHFH&RI, Kabiruzzaman et al, Bangladesh
		Men	Women		
IHD	50	59	48	36	35
Hypertension	4	70	78	14	29
Idiopathic	18	-	-	-	-
Valvular	4	22	31	7	22
DCM	-	-	-	12	
Unknown	13	-	-	34	-
Other	10	7	7	10	0.6
AF	-	-	-	5	-

DCM = Dilated cardiomyopathy. IHD = Ischemic heart disease.
AF = Atrial Fibrillation. (-) = Not mentioned as etiology.

Table-IV*Age of heart failure patients in different territories of the World*

> Hillingdon study, West London 5,	Median age = 76 years
> ESC countries 10,	Mean age = 75 years
> Framingham Heart study, USA8,	Mean age = 70 years
> Seow et al, Singapore 6,	Mean age = 68 years
> Jafary et al, Pakistan 4,	Mean age = 61 years
> Kabiruzzaman et al, NHFH&RI, Bangladesh,	Mean age = 54years

**Fig.-1:** Mean and median age of heart failure patients in different studies**Discussion:**

Clinical survey of heart failure in the general population is uncommon. Much of our current knowledge of heart failure is based on highly selected hospital series, or patients selected for clinical trials. Such patients do not reflect the spectrum of heart failure as it presents in the population.

Our study shows that mean age of hospitalized heart failure patients was 54.1 ± 15.3 years with higher prevalence in male than female and coronary heart disease being most common cause of heart failure. The mean age of our heart failure population is remarkably lower than that observed in different

studies done abroad³⁻¹⁰. The possible reasons for premature onset of heart failure may be lack of awareness of morbid risk factors and appropriate treatment. It has been reported that Asians may be less compliant with medication, perhaps because of distrust of western medicine and different cultural views¹¹.

Hypertensive heart disease leading to heart failure was found in 29.14%. This was second common cause of HF in our study. In addition to producing a pure form of hypertensive cardiomyopathy, hypertension is a major risk factor for heart failure from any cause².

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 disease³.

The Hillingdon heart failure study evaluated the incidence and aetiology 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%)⁵.

Seow et al studied 225 patients in Singapore with $LVEF \leq 40\%$, their mean age \pm SD was 68.5 ± 12.3 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%)⁶.

In Pakistan, Jafary et al studied 196 patients with mean age \pm SD 61.2 \pm 12.8 years with a high preponderance of males. All of them were suffering from systolic heart failure with LVEF \leq 40%, requiring hospital admission with more than 60% suffering from hypertension (67.3%) and diabetes mellitus (60.7%) and more than three-fourths having a history of coronary artery disease in the past⁴.

In the United States, it is primarily a disease of ageing, with over 75% of existing and new cases occurring in individuals over 65 years of age⁷. In the USA, the Framingham heart study has reported the mean age at the time of diagnosis of heart failure was 70 years. The incidence of heart failure to be 0.3% per annum in men and 0.2% per annum in women aged 50-59 years; rising by a factor of 10 to 2.7% per annum in men and 2.2% per annum in women aged 80-90 years. The incidence of heart failure was significantly higher in men than women at all ages with an age-standardized incidence ratio of 1.67⁸

Mcmurray et al studied trends in hospitalization for heart failure in Scotland 1980-1990. They found seventy-eight percent of discharges were in persons aged \geq 65 years and 48% of discharges were male⁹.

Remes et al 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% cases¹².

This is a single centre retrospective cohort study and our results may not be extrapolated to the entire Bangladeshi population. However, our hospital provides services to a wide mix of patients, ranging from affluent to poor, somewhat reflective of the population at large throughout Bangladesh. Because of the retrospective nature of the study several important variables are missing in our study including reliable documentation of signs and symptoms as well as anthropometric values. We could not determine co-

morbid illness like COPD, renal functional impairment, obesity.

Heart failure is a significant and growing health problem as the population ages. About one-seventh of total hospital admitted patients had heart failure. The mean age (54.1 \pm 15.3) of our heart failure patients was significantly lower than the other studies done abroad (Table-4). Coronary heart disease (with or without hypertension) should be the dominant aetiology of heart failure in Bangladesh. In this study the single most common aetiology was ischaemic heart disease (35.79%) and past history of hypertension was common (48.07%). This is very similar to the findings in the heart failure study done in Hillingdon (West London)⁵, Finland¹² and Sweden¹³ and is not dissimilar to that reported from Framingham study¹⁴ (Table-3). The number of patients with heart failure is bound to rise at the premature age if appropriate measurement is not taken to manage risk factors and to increase public awareness. Clinical and Epidemiological study is needed to explore further details.

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