Original Research Article

FREQUENCY OF ANEMIA IN PATIENTS ADMITTED WITH ACUTE DECOMPENSATED HEART FAILURE IN TERTIARY CARE CARDIAC HOSPITAL

ABSTRACT

Introduction: Anemia has recently been recognized as an important comorbid condition and potentially novel therapeutic target in patients with heart failure (HF). Anemia is common in HF patients, with a prevalence ranging from 4% to 55% depending on the population studied and no such study conducted in Pakistan. That is why this study aims to determine the prevalence of anemia and its significance in patients admitted with acute decompensated heart failure (ADHF).

Patients and methods: This was a hospital based study conducted in the Department of Cardiology, Tabba Heart Institute, Karachi From 1st November 2019 to 30th April 2020. A total of 203 patients with ADHF with age >35 years and <80 years were selected. A blood sample was taken to determine the hemoglobin levels and hemoglobin (Hb) levels <12.0 g/dL in women and <13.0 g/dL in men were taken as cut-off for anemia.

Results: Overall mean and SD of age was 63.70±10.53 years and among them most of were males (n = 116, 57.1%). The overall prevalence of anemia in patients with ADHF was quite high and 63.5% (n = 129). Only three condition, hypertension, diabetes mellitus, and current smoking habits had significant association with the occurrence of anemia in patients with ADHF, p value <0.05.

Conclusion: In conclusion, the results showed that anemia is an independent risk for HF. Anemia was observed in one-third of the study population. More

prevalent in male gender, elderly patients of age above 60 years, and associated with other comorbids.

Keywords: Anemia, Predictors, Acute decompensated heart failure, South-east Asia, Pakistan

INTRODUCTION:

Heart failure (HF) is an increasingly important cause of morbidity and mortality, with prevalence in the U.S. recently estimated near 5 million consisted of 2.2% (1, 2) and in Pakistan the data is quite old but estimates a prevalence of 2.8 million people suffering from heart failure (3). Although deaths from myocardial infarction (MI) and stroke have decreased by 50% over the past decade, mortality from HF has been steadily rising despite advances in medical and surgical therapy (4-6). In a survival study conducted by Clare J Taylor and colleagues have shown that survival rates in patients with heart failure were 75.9% (95% confidence interval 75.5% to 76.3%) at one year, 45.5% (45.1 to 46.0) at five years, 24.5% (23.9 to 25.0) at 10 years, and 12.7% (11.9 to 13.5) at 15 years (7).

Anemia in patients with acute decompensated heart failure (ADHF) is quite common and also linked to poor survival and quality of life. Even a small reduction in hemoglobin (Hb) concentration is associated with less favorable outcomes. Previously conducted study have shown the prevalence of anaemia in men (<13 g/dL) was 68% and in women (<12 g/dL) it was 52% (8). There

are reports revealing the prognostic significance of anaemia in HF patients. In patients from the Swedish HF Registry (9) ($n = 49{,}985$), anaemia revealed to be related with increased risk of mortality or HF hospitalizations (composite endpoint), greater in patients with less impaired LVEF (HR for preserved ≥50% and midrange (40–49%) vs. reduced (<40%): 1.24 and 1.26 vs 1.14; $_{\text{interaction}} = 0.003$). Ralli et al. (10) conducted a study on a cohort of 264 patients with advanced HF (mean LVEF 24%), showing that low Hb concentration in the setting of elevated B-type natriuretic peptide (BNP) is associated with markedly increased mortality. Patients without anaemia and with lower BNP levels had an excellent prognosis with a 96.3% one-year survival rate. In contrast, only 64.7% of those with anaemia and elevated BNP ($p < 0.001$) survived, representing a 10.4-fold increased risk of death (11).

The objective of this study was to determine the frequency of anemia in patients admitted with acute decompensated heart failure. This study will generate local data and actual prevalence of anemia in our population so that anemia can be diagnosed early & timely managed so the better outcome of such patients would be expected.

Material and methods:

This was a hospital based prospective clinical study conducted in the Department of Cardiology, Tabba Heart Institute, Karachi From 1st November 2019 to 30th April 2020 through a non-probability convenience

sampling technique. A total of 203 patients were selected having age more than 35 years and less than 80 years and who were admitted with acute heart failure with NYHA class III & IV of both gender. Patients with acute ST segment elevation myocardial infarction (STEMI), patients on hemodialysis or having grade IV or V Chronic kidney disease, patients with hematologic malignancies, patients with history chronic liver disease & upper GI bleed, and patients with 2nd & 3rd degree hemorrhoids were excluded from the study.

The diagnosis of ADHF was made using the latest guidelines proposed by the American Heart Association in which patients who presented with acute sudden on-set decompensation of/sudden worsening of heart failure symptoms will be labeled as ADHF (12).

According to the World Health Organization (WHO), anemia is defined as hemoglobin (Hb) levels <12.0 g/dL in women and <13.0 g/dL in men. A 5 cc of blood sample were taken from patients to determine the levels of hemoglobin (13).

A questionnaire was used to collect all the baseline and clinical characteristics of patients. All the collected data entered and analyzed by using the SPSS version 21. Mean and standard deviation was calculated for continuous variables like age, hemoglobin level. Frequency & percentages were calculated for categorical variables like gender, presence and categorization of anemia, diabetes mellitus, hypertension, educational status, economic status & smoking status. Effect modifier like diabetes mellitus,

hypertension, smoking status, economic status, and educational status was controlled through stratification. Post stratification chi-square test was applied and a p value ≤0.05 was taken as statistically significant.

RESULTS:

A total of 203 patients with acute decompensated heart failure were included for final analysis and among them most of them were males (n = 116, 57.1%) with a mean and SD of age was 63.70±10.53 years. Majority of them were belongs to lower social economic class (n = 104, 51.2%) but surprisingly illiterates were only 3.4% (n = 7). More than 72% (n = 147) had hypertension and 66.5% had type2 diabetes mellitus (n =135). Table no. 01.

The overall prevalence of anemia in patients with ADHF was quite high and 63.5% (n = 129) reported anemia at the time of study enrolment. The mean and SD of hemoglobin level was 11.87±4.17 gm/dL. Graph no. 01.

Table no. 02 shows association between baseline and other parameters of patients with ADHF with presence of anemia. Only three conditions condition, hypertension, diabetes mellitus, and current smoking habits had significant association with the occurrence of anemia, p value <0.05.

DISCUSSION:

Heart failure (HF) is a growing problem worldwide: more than 20 million people around the world are affected (14). The prevalence of HF follows an exponential pattern, and it rises with age. Heart failure affects 6% to 10% of people over the age of 65 years. Although the relative incidence is lower in women than in men, women constitute at least half of the cases of HF because of their longer life expectancy (15-17). Furthermore, hospitalization for acute decompensated heart failure (ADHF) is a powerful predictor of readmission and post-discharge death in patients with chronic HF, with mortality rates as high as 20% after discharge (18).

Although most studies have documented higher mortality rates in anemic ADHF patients some studies report the absence of an adverse effect of anemia on mortality in CHF (19-21). Therefore, better understanding of the risk associated with the presence of anemia is necessary. In prior studies, it is observed that ADHF is often accompanied by anemia. A wide range of anemia prevalence in CHF has been reported, ranging from 7% to over 50% (22-24). Even some studies also mention more than 60%-70% of patients had anemia. These findings are consistent with our study findings where more than 68% of our study subjects had anemia. In another study analysis, which examined more than 150,000 subjects, anemia was frequently observed, found in over one-third of CHF patients (25). A randomized controlled trial of 32 patients with NYHA class III and IV demonstrated that erythropoietin treatment reduced hospitalizations, increased left ventricular ejection fraction,

reduced HF class, reduced the required dose of intravenous furosemide, and slowed the decline of GFR (26).

Despite these inconsistencies in the definition of anemia cases, most studies indicate that the prevalence of anemia is increased in CHF populations with comorbid kidney disease, advanced age, and more severe symptoms (range, 30% to 61%) when compared with less symptomatic ambulatory populations (range, 4% to 23%). In patients with CHF and preserved ejection fraction, the few published reports indicate that anemia is also highly prevalent in this group (27-29).

In our study, results showed most of the study subjects were belongs to older age group and of female population was less. Mean age of study subjects was 63.70±10.53 years. About one-third patients were more than 60 years of age. Hypertension was found as the most common comorbid. No significant association of anemia was found with gender and age but the association was found significant with diabetes mellitus, hypertension, and smoking.

Limitation of the Study

There are limitations to this study. The selection of the sample was based on Disease Related Groups (DRG) of hospitalized ADHF patients. It therefore excludes all patients who were under observation for HF exacerbation, a group of HF patients that are usually less sick but have the same condition. Evaluation of anemia was only at baseline in all included studies. No evaluation of Hb was performed during the studies; thus, it remains unknown

whether anemia in the included studies was persistent or transient. One of the limitations of this study is that it was conducted in a single center with small sample size and also at urban environment, so the findings might not be generalizable to larger populations.

CONCLUSION:

In conclusion, the results showed that anemia is an independent risk for HF. Anemia was observed in one-third of the study population. More prevalent in male gender, elderly patients of age above 60 years, and associated with other comorbids.

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TABLE NO. 01: BASIC DEMOGRAPHIC CHARACTERISTICS OF STUDY PARTICIPANTS

(N = 203)

Age - years		
Mean±SD	63.70±10.53	
Minimum	35	
Maximum	80	
Range	45	
Gender	**n**	**%**
Male	116	57.1
Female	87	42.9
Socioeconomic Status		
Lower	104	51.2
Middle	94	46.3
Upper	5	2.5
Education Status		
Illiterate	7	3.4
Primary	74	36.5
Secondary	66	32.5
≥Graduation	56	27.6
Comorbids		
Hypertension	147	72.4
Diabetes Mellitus	135	66.5
Addiction		
Current smoker	37	18.2
Alcohol	3	1.4
Anemia		

Yes	129	63.5
No	74	36.5

GRAPH NO. 01: DISTRIBUTION OF HEMOGLOBIN LEVELS IN PATIETNS WITH ACUTE DECOMPENSATED HEART FAILURE

(N = 203)

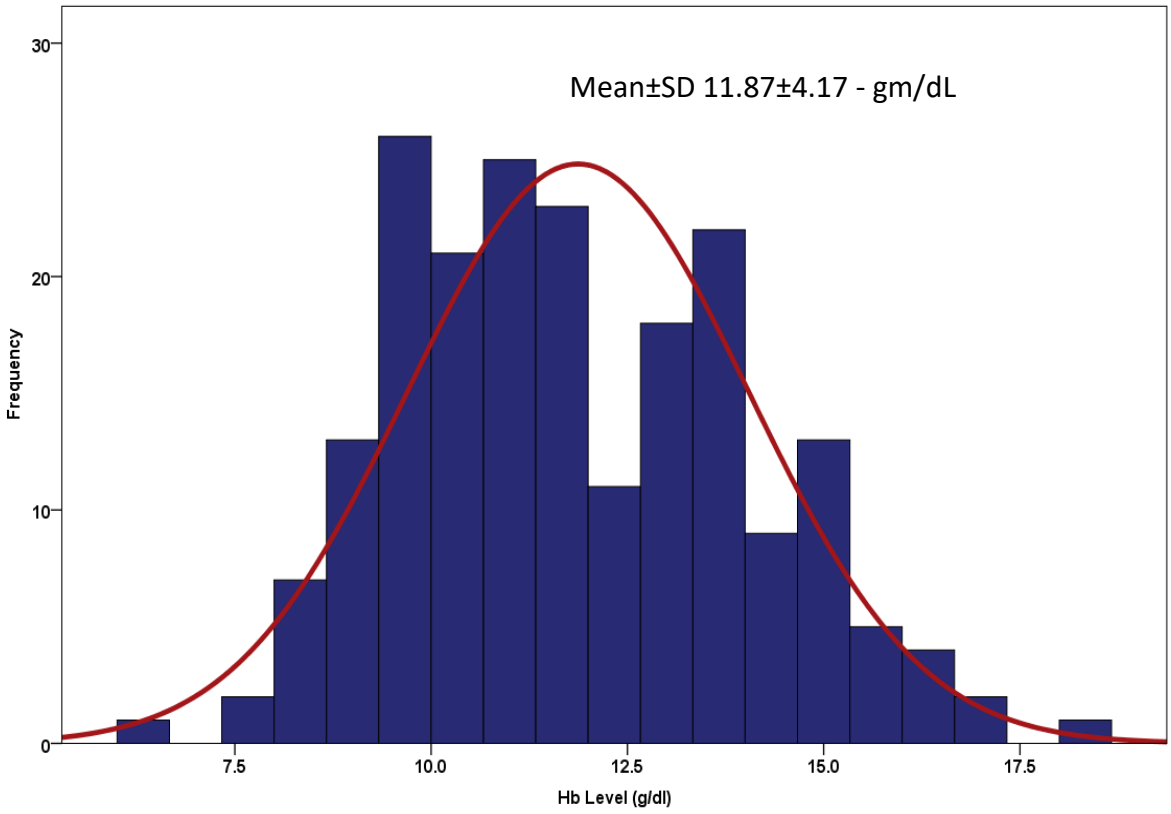

TABLE NO. 02: ASSOCIATION OF ANEMIA WITH BASELINE AND OTHER PARAMETERS OF PATIENTS WITH ADHF

(N = 203)

Variables	Anemia		Total	p value
	Yes	No		
	(n = 129)	(n = 74)	(N = 203)	
Age - years				
<60	43	32	75	0.15
>60	86	42	128	
Gender				
Male	70	46	116	0.27
Female	59	28	87	
Socioeconomic Status				
Lower	71	33	104	
Middle	57	37	94	0.064
Upper	1	4	5	
Education Status				
Illiterate	5	2	7	
Primary	48	26	74	
Secondary	37	29	66	0.43
≥Graduation	37	17	56	
Comorbids				
Hypertension	100	47	147	**0.03***
Diabetes Mellitus	93	42	135	**0.02***
Addiction				
Current smoker	20	17	37	**0.02***
Alcohol	2	1	3	0.07

*Chi-square test was used to determine the association between variables and a p value <0.05 was considered as statistically significant