Original Research Article

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

ABSTRACT

Introduction: Anemia is one of the potential comorbid condition in patients with acute decompensated heart failure (ADHF) which is linked to higher morbidity and mortality rates. Worldwide, its prevalence ranges from 4% to >70% in hospitalized patients with ADHF. Unfortunately data is lacking from our region and hence we aimed to conduct this study to scientifically fill the present gap by evaluating the actual burden of anemia in patients hospitalized with ADHF in a tertiary care hospital of Karachi, Pakistan

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:

Cardiovascular diseases particular heart failure is increasing in both developed and developing countries due to multiple reasons, most importantly, change in dietary habits, change in environmental (stress and pollution), and advances in diagnostic facilities. Currently, nearly more than 64.3 million people are suffering from heart failure worldwide and among them the annual mortality rate is greater than 9.1 million people (1, 2). In Pakistan the data is quite old but estimates a prevalence of 2.8 million people suffering from heart failure (3). On the other due to better treatment facilities, mortality due to acute myocardial infarction and acute onset of cerebrovascular accident has reduced drastically because of available acute management strategies such as primary percutaneous coronary intervention (PPCI) (4-6). The survival rate in patients with heart failure reduces each year from 75.9% at one year to 12.7% 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). In a Swedish study, comparison was made among anemic patients of ADHF with and without reduced ejection fraction (EF cut-off 50%). Patients who had ejection fraction <50% were more likely to have higher mortality rate than patients with ejection fraction >50% (9). Another comparison was made by the Ralli and colleagues (10), in which they have observed higher rates of mortality in patients with raised pro-BNP levels with EF <40% and anemia vs. normal pro-BNP levels with EF <40% and without anemia. among them, the one year survival rate was more than 96% (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 is a serious concern in developed and developing countries. The burden of this disease has exponentially doubled from 33.5 million in 1990 to 64.3 million in recent study published in 2017 (14). In past it was mainly a disease of older population but in recent advances in diagnostic facilities and increase in the burden of ischemic heart disease, it can be seen in patients with younger age group (age <40 years) and middle age group (age <60

years). In a recently published study had shown prevalence of HF in younger population was 1.5%, in middle group was 6.6%, and among older population was 10.6% (15). On the other hands, its prevalence is also lower in women than men but women face serious adverse effects and complications than men (16-18). Once the patient is hospitalized due to ADHF, the rate of re-hospitalization increases with increased mortality rate that may reach up to 20% (19).

Besides other precipitating factors of hospitalization in patients with ADHF, anemia is particularly plays a pivot role in re-hospitalization, complications, and increase in mortality rate (20-22). Timely corrections of anemia is crucial in reducing mortality and anemia related complications in patients with ADHF. Most of the patients (nearly >60%) at the time of hospitalization document anemia (23-25). 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 (26). A randomized controlled trial conducted on 32 patients with NYHA class III and IV demonstrated that use of erythropoietin for the treatment of anemia in patients with ADHF is linked to reduced morbidity & mortality, increases left ventricular ejection fraction, quality of life, improve GFR, and subsequently helps in reducing the dose of diuretics (27). There are multiple factors which may increase the prevalence of anemia in patients with ADHF irrespective of

underlying cause such as increasing age, underlying chronic kidney or liver disease, and malignancy (28-30).

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 multiple limitations in this study. Most importantly, we did not evaluated the cause of heart failure and type of anemia. Patients were selected from a single center which may reflect same group of population. Also, we did not analysed younger patients of age <35 years. Evaluation of anemia was only at baseline in all included studies. No evaluation of Hb was performed during the study or after patient's discharged; 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.

Ethical Approval:

As per international standard or university standard written ethical approval has been collected and preserved by the author(s).

Consent

As per international standard or university standard, patients' written consent has been collected and preserved by the author(s).

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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)

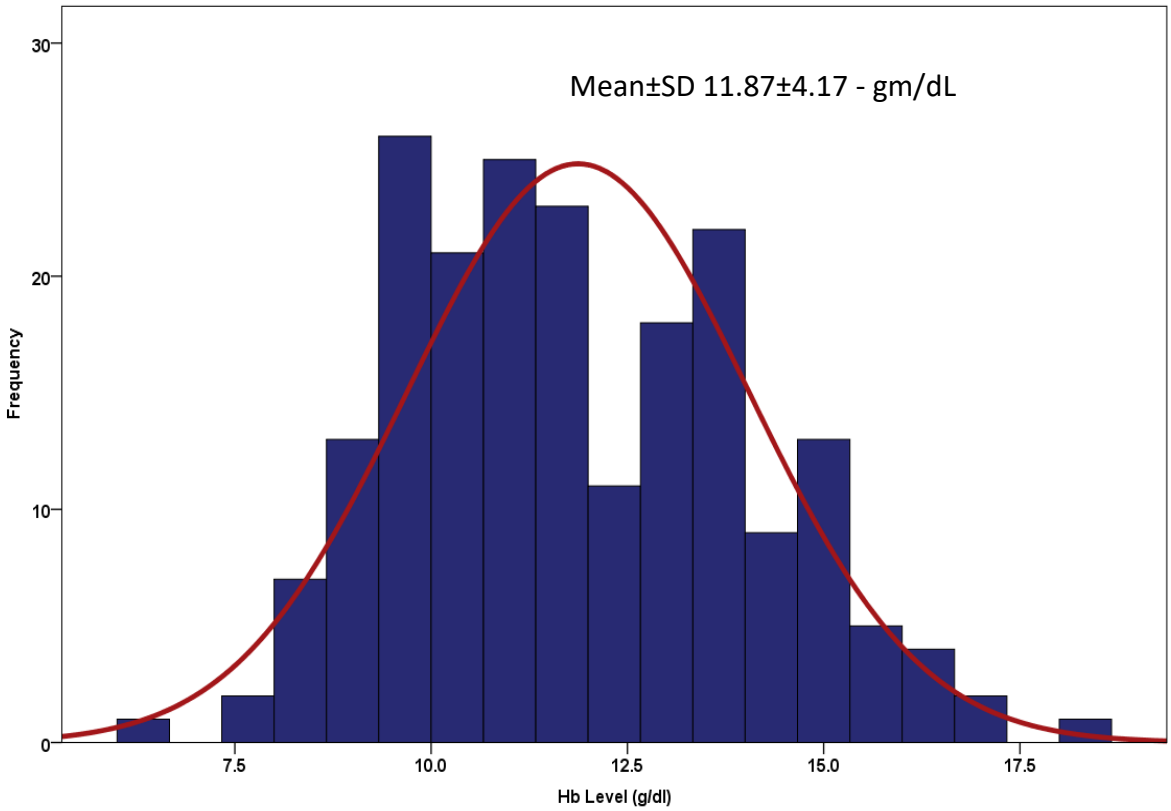

TABLE NO. 02: ASSOCIATION OF ANEMIA WITH BASELINE AND OTHER PARAMETERS OF PATIENTS WITH ADHF

(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