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Factors Contributing to Mortality in Hospitalized Heart Failure Patients

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ABSTRACT

Background: *Heart Failure (HF) is a persistent and progressive cardiac condition that hinders the heart's ability to adequately circulate blood, resulting in insufficient supply of oxygen and nutrients to other organs. The condition can occur at any age, however the likelihood of experiencing it rises with age.*
Objective*: to assess the factors contributing to mortality in hospitalized heart failure patients.*
Patients and methods: *Data base study which is included all hospitalized patients recorded with primary diagnosis of heart failure (HF) in our hospitals in Baghdad city for 2 years duration in the period from 2020-2022, with in the age 20 years and over.*
Results: *The main age group was in between 50-60 years (25.1%), and female (53.7%) were more than male (46.3%) with female to male ratio = 1.16:1. Arrhythmia were found in 53.7% of the patients, while long QTc were presented in 38.8% of them. 63 (24.7%) were dead and female represented in (61%) while male was represented (39%), Patients diagnosed with heart failure and subsequently admitted with problems had a 5.13-fold increased likelihood of mortality compared to those without difficulties. Patients who do not have cardiogenic shock had a 98.7% lower probability of death related to patients complicated by cardiogenic shock. Those who presented with an ejection fraction ranging from 30%–50% had an 89% lower likelihood of mortality associated to patients with an ejection percentage of ≤30.*
Conclusion: *prevalence of HF in female were more than male, and the female sex alone does not constitute a factor associated with higher in-hospital lethality, but the observed excess risk is related to at his oldest age.*
Keywords: *Heart failure, mortality, hospitalization, associated factors*

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INTRODUCTION:

Heart failure (HF) is an important public health problem and one of the main causes of morbidity and mortality worldwide (1) , representing a great burden for both the patient and for the society. It is estimated that 64. million people are currently living with HF all over the world, with worsening of their quality of life3 , and these figures are predicted to increase in the future. It affects mainly to elderly people, and the incidence and the prevalence increases considerably with age in the over 60s. Estimation of prevalence for the general adult population is 2% (1-3%) and 5-9%, especially, in people older than 65 years (2,3). The HF syndrome has been compared to an iceberg, where the visible section above the water level, represents the established cases of HF in the community: the most managed in the primary care setting and by cardiologists. The invisible, larger part, below of the water level, represents the cases of undetected HF and those with left ventricular dysfunction asymptomatic considered likely to develop HF (4). Patients who have structural heart dysfunction but do not exhibit any clinical symptoms are typically not identified unless they undergo an imaging evaluation such as an echocardiography (5). There is a growing body of evidence supporting the use of biomarkers, specifically natriuretic peptides such as B-type NP (BNP) and pro-BNP N-terminal (NT-proBNP), for accurately detecting the existence or severity of heart failure 10-14. Nevertheless, several factors like age, gender, race, kidney dysfunction, and body mass index, as well as other cardiac and non-heart problems, might influence the elimination of the NPS. Consequently, different populations of patients may require distinct doses of the NPS for optimal effectiveness (6,7). Heart failure (HF) is an escalating global public health issue: it ranks as the primary reason for hospitalisation among adults and represents a significant contributor to cardiovascular morbidity and mortality in developed nations. In recent decades, the occurrence of HF has risen due to the ageing population, improved survival rates of coronary events, and advancements in pharmacological treatments for the illness (8). There is a lack of comprehensive studies that assess the occurrence of HF and the resulting death rates in the Middle East. However, there are some scattered data from specific regions, such as a recent trial in Saudi Arabia that examined a group of 1090 patients with acute HF. This trial found that the overall mortality

rate within 30 days was 7.5% (9). In Oman, the incidence of HF is 5.17 per 1000 persons. The value in question seems to be lower than what has been reported in more advanced nations, potentially due to the bias in the Omani study deriving from the examination of data from only one center (10). The hospital admission for patients with heart failure may result from either an abrupt or progressive decline in a previously stable condition of disease. As stated in reference (11), regardless of the circumstances, being admitted to the hospital for HF carries a substantial danger for them. The hospital mortality rate for individuals with this disease in African country varies from 9-12.5% (12). In relation to the evolution and forecast of the disease differences by sex have been described, for example, in the United States of America 52.6% of the prevalent cases and 52.2% of the incidents involved women, in addition 51% of hospitalizations and 57.8% of deaths from HF occurs in them8. Women with diagnosis of HF are older, with ejection fraction preserved, a greater number of comorbidities, increased functional limitation and poorer quality of life than the men. Despite these differences, in the most studies, sex is not associated with increased in-hospital mortality (13). Our objective in this study was to assess the factors contributing to mortality in hospitalized heart failure patients

PATIENTS AND METHODS:

Data base study which is included all hospitalized patients recorded with primary diagnosis of heart failure (HF) in our hospitals in Baghdad city for 2 years duration in the period from 2020-2022, with in the age 20 years and over. The generated database includes the following variables: age, gender, occupation, address, graduation commune, type of establishment, modality of attention, date of discharge, days of stay and condition of discharge. The socio-demographic characteristics (age and sex) are described and associated with hospitalization (days of stay, type of establishment and discharge condition) with median and 25th-75th percentiles for the continuous variables and percentages for the categorical ones. According to the age we divided it into 5 groups (<30 years, 30-39 years, 40-49 years, 50-59 years and ≥60 years), also the data were included laboratory investigations, ECG and Echo finding

Statistical analysis

Characteristics were compared between men and women by Student t test for the continuous variables and chi square test for categorical ones. Using multivariate logistic regression factors associated with lethality were evaluated in-hospital; odds ratio (OR) were calculated and 95% confidence intervals. The level of significance considered for all the analyses was 5% to two-tails and the statistical analyses were made with SPSS software version 25.

RESULTS:

The current study were included 255 patients with heart failure who admitted to our hospital, and the main age group was in between 50-60 years (25.1%), and female (53.7%) were more than male (46.3%) with female to male ratio = 1.16:1. (**Table 1**) Anemia was found in 40% of the patients, 72.5% of them presented with creatinine more than 1.3 (mg/dL, 83.5% have had BUN value more than 24(mg/dL), and 60% of patients with heart failure were presented with hyonatremia, all of the findings are shown in (**Table 2**). Arrhythmia were found in 53.7% of the patients, while long QTc were presented in 38.8% of them (**Table 3**). Among the studied , 63 (24.7%) were dead and female represented in (61%) while male was represented (39%), and patients improved in (67.1%), while only (8.2) were referred to other hospital due to different causes (**Figure 1**). Regarding the difference between many variable, there is a significant difference in three independent variables were found. In which Patients diagnosed with heart failure and subsequently admitted with problems had a 5.13-fold increased likelihood of mortality compared to those without difficulties. Patients who do not have cardiogenic shock had a 98.7% lower probability of death related to patients complicated by cardiogenic shock. Those who presented with an ejection fraction ranging from 30%–50% had an 89% lower likelihood of mortality associated to patients with an ejection percentage of ≤30 (**Table 4**).

Table 1. Baseline criteria of the studied group

Baseline criteria		No.	%
Age (years)	<30	29	11.4
	30-39	44	17.3
	40-49	60	23.5
	50-60	64	25.1
	>60	58	22.7
Sex	Female	137	53.7
	Male	118	46.3
Total		255	100

Table 2. Laboratory investigation finding in the studied group

Lab investigation		No.	%
Anemia (mg/dL)	Yes (<12)	102	40.0
	No (>12)	153	60.0
Creatinine (mg/dL)	>1.3	185	72.5
	≤ 1.3	70	27.5
BUN (mg/dL)	>24	213	83.5
	≤ 24	42	16.5
Na (meq/l)	Normal	102	40.0
	Low sodium levels (Hyponatremia) <135	153	60.0

Table 3. ECG change in the studied group

Variable		No.	%
Arrhythmia	Present	137	53.7
	Absent	118	46.3
Long QTc	Present	99	38.8
	Absent	156	61.2

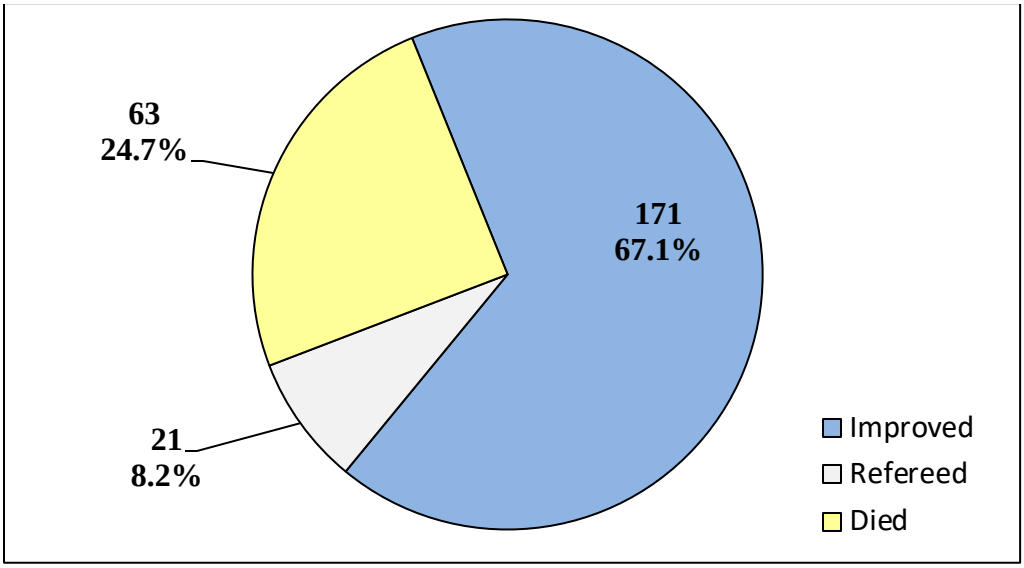

Figure 1. Outcome of the studied group (Mortality rate : 24.7%)

Table 4. Association between different multivariable

Variables		No.	%	AOR	C.I 95%	P. value
Complication at the time of admission	Present	101	39.6	5.13	1.31-20.4	0.030 sig
	Absent	154	60.4	1		
Cardiogenic shock	Present	14	5.6	1	0.001-0.273	<0.001 sig
	Absent	241	94.5	0.013		
EF%	≤30	63	24.7	1	0.01-0.60	0.005 sig
	30-50	144	56.5	0.11		
	≥50	48	18.8	1.289	0.13-17.4	0.700 ns

AOR: Adjusted odds ratio, CI; confidence interval, EF; ejection fraction
sig: significant, ns: not significant

DISCUSSION:

This paper provides a first approximation of morbidity and mortality by HF in Iraq using hospital data sources. These results they show differences, both in the incidence and in the lethality by HF, between women and men. While the incidence of hospitalizations by HF is greater in men and increases in a way significant with age, on the contrary, the prevalence of hospitalizations is higher in women, who also have a higher risk of in-hospital death, effect which disappears when adjusting for age. The factors related to higher lethality were: age

equal to or older than 60 years, a hospital stay more than 7 days. The relationship of sex with the epidemiology of HF is controversial. Although many studies have shown that this disease preferentially affects men1 (14-16), there is evidence that the prevalence and incidence is increasing in women as they get older. In the Framingham Study, the incidence rates for men compared to women were 5.6 vs 3.3 per 1,000 people years, respectively (17). Bui et al., in the United States of America, they estimated higher prevalence for men in all age groups, reaching 14.7% for men and 12.7% for women in the stretch age about 79 years (18). On the contrary, Mehta et al. they reported findings similar to ours, with a higher prevalence of HF in women than in men, increasing as it increases the age (7.9% vs 6.6% respectively) (19). Possible explanations for this apparent heterogeneity this is due to the difficulty posed by the diagnosis of HF in women. In fact, the form more prevalent of HF in the older female sex advanced is the one with preserved ejection fraction (20), which often leads to difficulty diagnostic. In addition, women develop cardiovascular diseases between 7 and 10 years later than men, which explains the greater prevalence of HF in women over 60 years (21). Also, the increase in life expectancy for women during the last few years exceeds to that observed in men worldwide (73 years for women and 69 years for men), which results in increased survival and, therefore, increased likelihood of developing clinical HF in the last period of life (22). The main limitation of our study is the use of data from administrative sources, which are provided by providers of health and might not disclose the absolute values of the estimates presented. Despite this, the ministerial databases are still, at the level international, the most commonly used tool used for estimating the magnitude of diseases, especially those based on in discharge diagnostics. In the case of the HF, the mortality and hospital discharge statistics, usually used to determine the load of disease, they underestimate the prevalence, since that is not always recognized as an entity independent of another disease of the cardiovascular system. There are factors such as the difficulty in diagnosis, the absence of markers specifically, the classification of the HF as mediator and not as a cause of death, and the deficient quality of hospital records that favor the underestimation of HF as a health problem (23). A second limitation stems from the hospital statistics fact are based on in events and not in subjects, which allows for multiple re-

hospitalizations of a single subject are considered to be different events, which limits the interpretation of incidence rates derived from these data.

CONCLUSION:

HF is a prevalent pathology within cardiovascular diseases in our country, whose magnitude is difficult to estimate only from of administrative data sources. However, despite the limitations, prevalence of HF in female were more than male, and the female sex alone does not constitute a factor associated with higher in-hospital lethality, but the observed excess risk is related to at his oldest age.

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