

Saiful Anwar Hospital Heart Failure Registry (SAHEFAR) : A Valuable Tool for Improving the Management of Patients with Heart Failure in Malang, East Java

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Abstract: The incidence of heart failure (HF) in Malang has been increasing. Thus, a registry is required to accommodate better comprehension of HF patients, particularly in Malang. To examine this demographic, clinical and biological baseline characteristics and outcomes of hospitalised patients with HF are tracked by creating the Saiful Anwar Hospital Heart Failure Registry (SAHEFAR) as a manual for continually improving quality of care. This is a single-centre, retrospective cohort study. We included patients with diagnosed HF based on 2016 ESC HF criteria. The patients were assessed and their symptoms, physical examination, laboratory results, electrocardiography, echocardiography, prior medical and in-hospital treatment were recorded. We followed up with the patient from initial hospital admission until discharge. The outcome and all-cause mortality were recorded. The total patient data collected from January 2016 to August 2019 was 1208. Male predominance was seen (58.1%). The most common precipitating factor of admission for HF was coronary artery disease (60.1%), with the classification NYHA class III–IV (44.5%). The number of patients receiving optimal medication was 63%. In-hospital for all-cause mortality was 19.5%. SAHEFAR can be a valuable tool for therapeutic approaches undertaken in daily practice and may improve the outcomes of HF patients in a more specific setting, particularly in Malang.

1. BACKGROUND

Heart failure (HF) is a one of the major public health problem worldwide. HF has emerged as a major global health issue, with an estimated worldwide prevalence of more than 37.7 million. The burden is rapidly increasing, and it is projected that by 2030, the number of HF patients will increase by 25% (Bacal et al., 2015). HF is a disease with a high mortality rate; average survival is five years with marked impairment in the quality of life, making this disease the central focus of these patients' lives. Approximately 80% require at least one hospitalisation due to decompensation, which represents a negative breaking point in patient evolution (Chioncel et al., 2015).

Epidemiological data on HF is missing in many countries because of the absence of relevant observational studies to capture the incidence, prevalence, prognosis and main causes of HF (Fairman et al., 2017). Proper understanding of the epidemiology and the clinical characteristics of HF in a specific population is critical for improving prognosis. Randomised clinical trials bring important epidemiological information, but generalisation and applicability are limited by the strict inclusion and exclusion criteria (Laotavom et al., 2010). Even though registries do not have such limitations and likely reflect the global population with HF in a certain geographical area, there are significant differences at both the continental and regional levels in regard to the severity, aetiology and management for HF (Savarese et al., 2019).

The purpose of the Saiful Anwar Hospital Heart Failure Registry (SAHEFAR) is to improve and develop the care of patients with a specific diagnosis in a specific hospital by providing continuous information about care and therapy. In addition, information from one hospital can be compared with the average from the other participating hospital. The long-term goals of the registry are to prevent worsening symptoms, improve the quality of care, reduce morbidity and mortality and lower the cost of managing patients with HF.

2. METHOD

SAHEFAR was established in 2016, and we collected data from then until now. This is a single-centre and retrospective cohort study focused on acquiring information about patients with HF. It was initially a paper-based registry, and then the data was transferred onto computerised patient records. We included a patient with diagnosed HF based on the 2016 ESC HF criteria.

First, we acquired basic information about the patients, including sex, age, address, phone number, level of education, occupation, marital status and sources of financing. Afterwards, data collection will include a physical examination and vital signs, including blood pressure, heart rate, demographic variables, clinical symptoms, functional status, date of HF diagnosis and prior cardiovascular investigations, clinical risk factors, lifestyle factors and socioeconomic status, and a survey of cultural beliefs, health practices and attitudes towards device therapy.

We also collected laboratory samples, which consisted of haemoglobin, leucocyte, ureum, creatinine, random blood sugar, uric acid, liver function test, albumin, haemostatic function, troponin and CKMB, natrium, kalium, low-density lipoprotein, high density lipoprotein, triglyceride, cholesterol and blood gas analysis. Patients were examined with a 12-lead electrocardiography standard and transthoracic echocardiography and followed from their initial hospital admission until discharge.

2.1 Eligibility Criteria

The inclusion criteria for the database adhere to the European guidelines for AHF. There must be the symptoms of HF, which is dyspnoea, increased fatigue and ankle swelling. Objective signs of HF consist of elevated jugular venous pressure,

pulmonary crackles and peripheral oedema and displacement of the apical impulse (Ponikowski et al., 2016). The decision on inclusion in the registry and populating the database was made by the doctor in charge in the emergency room. There was no exclusion criterion.

Patients were systematically classified according to the type of AHF (*de novo* or acute decompensation of chronic heart failure), aetiology of AHF (acute coronary syndrome, chronic coronary artery disease, valvular disease, arrhythmia, hypertensive crisis and so on) and six basic syndromes of AHF defined according to ESC guidelines: 1) acute decompensated heart failure (ADHF, with signs and symptoms of AHF, which are mild and do not fulfil criteria for cardiogenic shock, pulmonary oedema or hypertensive crisis); 2) hypertensive AHF (symptoms of AHF are accompanied by high blood pressure on admission and relatively preserved left ventricular function with a chest radiograph compatible with acute pulmonary oedema); 3) pulmonary oedema (accompanied by severe respiratory distress, with crackles over the lungs and orthopnoea and O₂ saturation usually <90% prior to treatment); 4) cardiogenic shock (defined as evidence of tissue hypoperfusion induced by heart failure after correction of preload, mostly with systolic BP <90 mmHg ongoing for at least 30 minutes); 5) high output failure (characterised by high cardiac output, usually with high heart rate, often caused by arrhythmias, thyrotoxicosis crisis and anaemia); and 6) right heart failure (characterised by low output syndrome with increased jugular venous pressure, increased liver size and hypotension) (Schøedt et al., 2016; Wang et al., 2016).

The primary endpoint of this registry is to describe the epidemiological characteristics of inpatients with heart failure. It can also provide data related to diagnosis, aetiology, precipitating factor and treatment.

2.2 Limitation

There are a limited number of participating hospitals or cardiac centres. Most of the patient recruitment was in the Saiful Anwar Hospital, rather than from all parts of Indonesia. Additionally, the registry was only done in one cardiac centre, and it was a government or university hospital with limited beds only available for very sick patients. Finally, SAHEFAR data came from medical records of hospitalised patients so it represented an epidemiologic study of hospital-based heart failure;

thus, it does not represent national data on heart failure.

3. RESULTS

The total number of patients registered in this pilot study was 1208 patients. The independent factors were the demographic characteristics that are shown in Table 1. Overall, our patients had an age of fewer than 60 years, and 62.3% were male (see Figures 1 and 2). Compared with patients in the United States, our patients tended to be younger. Due to our region within Malang, most our patients were of Javanese ethnicity and held various occupational statuses. There were 81.6% of patients living in and around Malang, which is <50 km from Saiful Anwar General Hospital.

Table 1: Sociodemographic characteristics.

Sociodemographic characteristics	Percentage (%)
Male	62.3
Female	37.7
< 60	57.4
60–69	28.7
70–79	10.7
> 80	3.3

Javanese	98.4
Chinese	0.8
Arabian	0.8
Less than elementary school	8.2
Elementary school (finished)	24.8
Junior high school (finished)	21.5
Senior high school (finished)	37.2
University	8.2
Jobless	18
Student	1.6
Housewife	13.1
Employee	4.9
Pensionary	10.7
Entrepreneur	35.2
Farmer/Fisherman	11.5
Labour	4.9
Not married	1.6
Married	93.4
Divorced	4.9
Private/Independent	4.9
Government	95.1

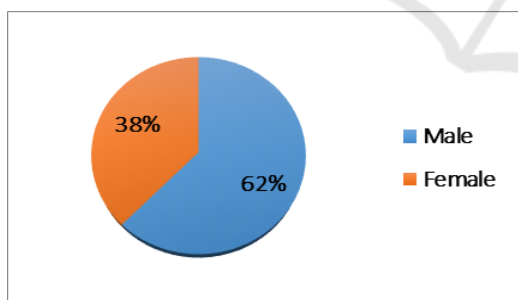


Figure 1: Characteristics of gender.

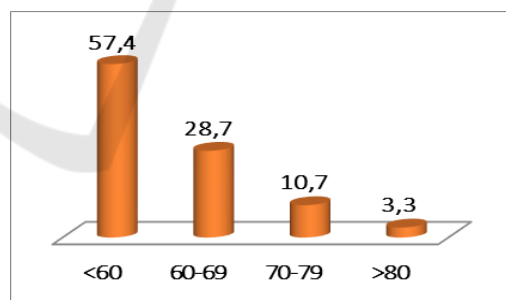


Figure 2: Characteristics of age.

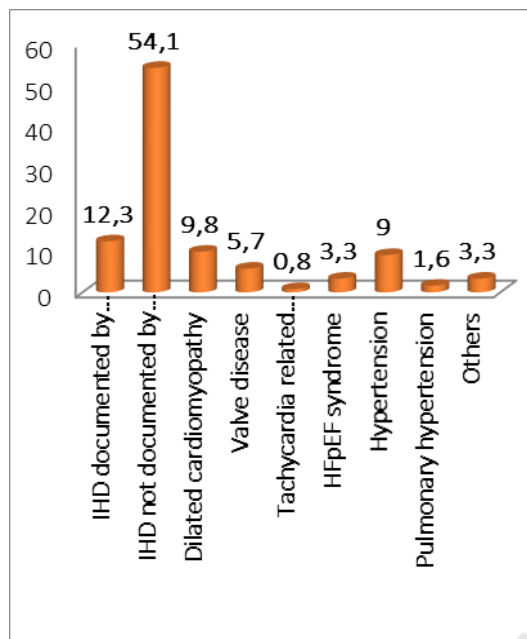


Figure 3: Aetiologies of heart failure.

Table 2: Clinical characteristics.

Clinical characteristics	Percentage (%)
History of HF	
Yes	69.7
No	30.3
IHD documented by coronary angiography	12.3
IHD not documented by coronary angiography	54.1
Dilated cardiomyopathy	9.8
Valve disease	5.7
Tachycardia related cardiomyopathy	0.8
HFpEF syndrome	3.3
Hypertension	9
Pulmonary hypertension	1.6
Others	3.3
No	82.8
Permanent	4.9
Persistent	4.9
Paroxysmal	7.4
I	2.5
II	27.9

III	44.3
IV	25.4
Infection	11.8
Poor compliance	15.7
Inadequate treatment	7.8
Acute coronary syndrome	33.3
Arrhythmia	10.8
Volume overload	2.9
Hypertension crisis	6.9
Valve regurgitation	2
Post-partum cardiomyopathy	1
Decreased renal function	1
Overactivity	1
Pulmonary hypertension	1
Coronary arterial disease	2.9
Hypertensive heart disease	1
Others	1
Sinus rhythm	82
Junctional	0.8
Atrial fibrillation	15.6
Total AV block	0.8
Ventricular pacing rhythm	0.8
Mean EF	46.7
EF ≥ 40%	65.6
EF < 40%	34.4
Resolved	86.9
Death	13.1
Cardiogenic shock	25
Septic shock	37.5
Respiratory distress	18.75
Ventricular fibrillation	6.25
Ventricular tachycardia	6.25
Critical pulmonary hypertension	6.25

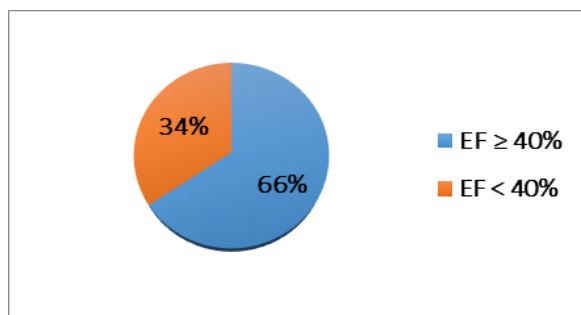


Figure 4: Variation of ejection fraction.

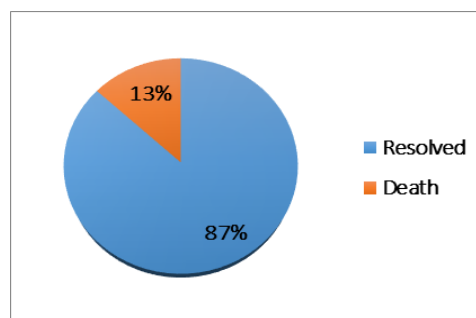


Figure 5: Clinical outcome.

In our cases, we found that most patients came with worsening heart failure due to acute coronary syndrome (33.3%) and paralleled with ischemic heart condition (66.4%), documented or undocumented by coronary angiography, to be the leading precipitating factor. Other aetiologies were dilated cardiomyopathy (9.8%) and valve disease (5.7%) (Figure 3). We found poor compliance (15.7%) and infection (11.8%) to be the leading precipitating factors after myocardial infarction. The incidence of coronary arterial disease is relatively high at our hospital, and in Western countries. It is contradictive with South Asian countries, suggesting that the incidence was relatively low. The ethnic predisposition can be exaggerated by nutritional, environmental and behavioural factors. However, our data in Indonesia demonstrated the finding that coronary artery disease tends to be higher and has an important role in the development of heart failure. Another challenging condition showed that our patients had dilated cardiomyopathy and valve disease because further aggressive treatment was needed.

The median hospital length of stay was 7.5 days, a shorter period than in Europe and Latin America (9.0 and 9.9 days, respectively). We found a hospital mortality of 13.1% (see Figure 5), which was higher than the mortality rate in the Asia Pacific Region (4.8%) vs. the United States (3.0%), similar to Europe (6.7%) and lower than Latin America (8.0%). The most common of aetiologies were septic shock (37.5%) and cardiogenic shock (25%). Our patients were commonly found with preserved ejection fraction (65.6%), but the mean of ejection fraction was 46.7% (Figure 4). Such facts indicated that most of our patients came in better condition, but had a poorer outcome. Such conditions may be indicated for treatment strategy at our hospital.

Table 3: Risk factors.

Risk factors	Percentage (%)
Never	50
Current	21.3
Former	28.7
Yes	30.3
No	68.9
Newly diagnosed	0.8
Never	95.1
Former	4.9
Minimal	27.9
Moderate	68.0
Heavy	4.1

Based on clinical presentation, we also noted that newer patient (*de novo* acute HF) as represented by a lower incidence of a prior heart failure history compared to the U.S. data (69.7% vs 76%). Half of our total patients had a smoking habit (50%), and 68% participated in moderate physical activity.

Based on the above data, we conclude that heart failure is one of the leading causes of readmission and mortality at Saiful Anwar General Hospital in Malang. In summary, our data show that males are twice as common as females, younger, of Javanese ethnicity with EF 40%; and the leading aetiologies of heart failure are coronary artery disease, dilated cardiomyopathy and hypertension. The mortality rate is 13.1%, and the leading death aetiologies are septic shock and cardiogenic shock. Due to our limitations and poor compliance of patients, however, we were unable to completely perform comprehensive examinations such as biomarkers, exercise tests and Holter monitoring.

From these initial data, we are now building a local registry of incidences of heart failure with more subjects and greater examination. We feel it is essential that we convince the doctors and the government that heart failure has become an epidemic cardiovascular disease with high mortality and morbidity rates and a significant cost that could be prevented by a national health program that addresses coronary artery disease and hypertension. To improve heart failure treatment, every large hospital should have a heart failure clinic with a prevention program that will work to decrease the cost, morbidity and mortality of heart failure.

4. CONCLUSIONS

Heart failure has a high prevalence in Malang, resulting in hospital admission. SAHEFAR can be an effective and useful media to collect data and reveal characteristics of patients with HF, hospitalisation length-of-stay, mortality and suboptimal guideline-directed medical treatment. This registry can be a valuable tool for guiding therapeutic approaches undertaken in daily practice. It may also improve the outcomes of HF patients in a more specific setting, particularly in Malang.

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