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Original article

Prevalence of Different Etiologies for Heart Failure Among a Contemporary Cohort of Egyptian Patients

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Abstract:

Background: Heart failure (HF) is a major public health concern globally and in Egypt. Understanding the prevalence of different etiologies and management practices in Egyptian HF patients is crucial for targeted healthcare strategies. This study aimed to assess the prevalence of different etiologies and management practices in a contemporary cohort of Egyptian patients with HF.
Methods: This cross-sectional, multi-center observational study was conducted over 12 months at Agouza Police Hospital and Benha University Hospital, including 503 Egyptian HF patients. Data collection involved patient interviews, clinical examinations, and reviews of medical records and diagnostic tests. **Results:** This study comprised 70% males and 30% females, with an average age of 61 years. The primary etiologies of HF were ischemic heart disease (68.8%), hypertension (23%), and valvular heart disease (5.2%). The mean left ventricular ejection fraction (LVEF) was 45% ± 12. Pharmacological therapy included ACEIs/ARBs (79.9%), ARNI (10.9%), Beta-blockers (95.4%), MRAs (86.8%) and SGLT2 inhibitors (84.9%). A total of 94.4% of patients exhibited ECG abnormalities, and 34.3% had abnormal chest X-rays.
Conclusion: Ischemic heart disease and hypertension constituted the most common causes of HF. A significant percentage of patients received ACEIs/ARBs, Beta-blockers, MRAs, and SGLT2 inhibitors. The study highlights the need for tailored management strategies in the Egyptian context, considering the specific etiological patterns and treatment practices observed.
Keywords: Prevalence; Etiologies; Heart Failure; Egyptian Patients.

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Introduction

Heart Failure (HF) is commonly defined as a clinical condition marked by symptoms and/or indicators resulting from structural and/or functional irregularities in the heart. This condition is further categorized based on the ejection fraction (EF): HF with reduced EF (HFrEF), HF with mildly reduced EF (HFmrEF), HF with preserved EF (HFpEF), and HF with improved EF. HFrEF is associated with significant loss of cardiomyocytes, resulting in systolic dysfunction, whereas HFpEF is characterized by alterations in the structure and cells of the heart that hinder the relaxation of the left ventricle [1, 2].

HF is categorized based on the affected side of the heart. Left-sided HF, often caused by left heart pathologies, can lead to right-sided HF, which is typically caused by right heart conditions. Most patients with right HF also have some form of left HF, indicating the interdependence of these conditions [3].

Globally, an estimated 64.3 million people live with HF, with a prevalence of 1% to 2% in the adult population in developed countries. In Egypt, cardiovascular disease (CVD), and by extension HF, has emerged as a prominent contributor to mortality since the 1990s and onward, contributing to the growing public health burden [4].

Ischemic heart disease and hypertensive heart disease are the leading causes of HF worldwide, followed by COPD and other conditions such as non-rheumatic degenerative mitral valve disease and alcoholic cardiomyopathy. This global trend in HF etiologies sets the stage for investigating the prevalence and management practices in Egyptian HF patients [5].

Therefore, this study assesses the prevalence of different etiologies and management practice patterns in a contemporary cohort of Egyptian Patients with HF.

Materials and Methods:

Study Design and Patients:

This was a multi-center, observational investigation (prevalence study) carried out at Agouza Police Hospital and Benha University Hospital. The primary objective of this research was to evaluate the occurrence rates of various causes of HF within a contemporary group of Egyptian patients throughout a 12-month period spanning from October 1, 2022, to September 30, 2023.

The study was done after being approved by Ethics Research Ethics Committee, Faculty of Medicine, Benha University (Approval no: MS 22-9-2022)

The study involved 503 Egyptian patients with HF, including those receiving outpatient care at the clinics of the aforementioned institutions and individuals admitted for acute, pre-existing, or newly diagnosed HF who met the specific inclusion criteria.

The inclusion criteria covered all outpatients with chronic HF at the participating centers, individuals admitted to these centers with complaints of new-onset HF (characterized by rapid or gradually worsening symptoms and/or signs of HF associated with adverse outcomes, necessitating urgent evaluation and treatment [1]), and individuals admitted to the participating centers with complaints of acute decompensated HF (defined as the presentation of congestive symptoms and signs, along with impaired organ perfusion due to HF, requiring immediate intervention. These patients experience a gradual worsening of their symptoms and signs due to cardiac and vascular dysfunction caused by various underlying factors, ultimately resulting in decompensated hemodynamics [6]).

Exclusion criteria encompassed patients below the age of 18, patients with chronic renal disease, respiratory failure, and end stage liver disease.

Study process and Data collection (Fieldwork):

Patient Interview:

A meeting was held with each patient, during which the researcher explained the

research objectives and steps. To obtain informed consent before checking the patient's medical files, the researcher explained the aim and steps of the study.

Data were collected and noted with observation and the review of patients' files.

The following data were collected from each patient:

Socio-demographics: Information on socio demographic characteristics was collected including age, sex, body mass index, marital status), educational level and employment status.

Then questions about possible causes and risk factors of HF.

A full clinical examination was conducted, with particular emphasis on the blood pressure and pulse of the patients. Moreover, an examination involving the auscultation of the back was conducted to detect any clinically discernible signs of pulmonary venous congestion. Additionally, auscultation of the heart was performed to identify the presence of audible murmurs, third or fourth heart sounds.

Patient files were checked for laboratory investigations, baseline electrocardiography (ECG) and transthoracic echocardiography.

All patients underwent a thorough echo-Doppler assessment using the Vivid e echocardiography machine equipped with a 3S-RS probe, following the recommendations outlined in the American Society of Cardiology guidelines. This evaluation encompassed various cardiac perspectives and was carried out alongside continuous ECG monitoring [(7)]. To compute ejection fraction (EF) and detect regional wall motion abnormality, the Modified Simpson method was employed through two-dimensional echocardiography [(8)]. For evaluating valve conditions and their severity, left ventricular end-diastolic diameter, left ventricular end-systolic diameter, left atrial diameter, and left ventricular hypertrophy, color flow mapping, M mode, pulsed wave, and continuous wave Doppler techniques were utilized [(9)].

In terms of patient management, a comprehensive medical treatment plan was implemented, which included the use of Angiotensin-converting enzyme (ACE) inhibitors, Angiotensin receptor-neprilysin inhibitors (ARNI), beta-blockers, aldosterone antagonists, sodium-glucose cotransporter-2 (SGLT2) inhibitors, diuretics, angiotensin receptor blockers, and inotropic agents. Furthermore, interventional procedures such as cardiac resynchronization therapy (CRT) and implantable cardioverter-defibrillator (ICD) placement, along with PCI and CABG, were considered as necessary measures.

Statistical analysis:

For data management and statistical analysis, IBM SPSS Statistics version 28 (Armonk, New York, United States) was employed. The normality of the distribution of quantitative data was assessed using the Kolmogorov–Smirnov test and visualized directly through data visualization techniques. Depending on the distribution of the data, quantitative variables were summarized as means with standard deviations or medians with ranges. Categorical data were presented as frequencies and their respective percentages. To analyze quantitative data in relation to the HF status, we utilized either a one-way analysis of variance (ANOVA) test or a Kruskal-Wallis test, depending on the normality of the data distribution. These tests were applied for normally distributed and non-normally distributed quantitative variables, respectively. Similarly, when assessing gender differences in quantitative data, we employed either the Mann-Whitney U test or the independent t-test, depending on the normality of the data distribution. The choice of test was made based on whether the data followed a normal distribution for normally and non-normally distributed quantitative variables, respectively.

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Comparisons involving categorical data were conducted using either the Chi-square test or Fisher's exact test. All statistical tests were two-sided, and statistical significance was defined as a p-value less than 0.05.

Results:

Baseline clinical characteristics are illustrated in Table 1. The baseline laboratory characteristics of the studied patients are illustrated in Table 2.

Table 1: Baseline clinical characteristics of the studied patients.

Parameters		
Age (years)	Mean ±SD	61 ±12
Gender		
Males	n (%)	352 (70)
Females	n (%)	151 (30)
Residency		
Urban	n (%)	194 (38.6)
Rural	n (%)	309 (61.4)
Patients educational level		
Illiterate	n (%)	33 (6.6)
School	n (%)	280 (55.7)
College	n (%)	187 (37.2)
Master or PhD	n (%)	3 (0.6)
BMI (kg/m^2)	Mean ±SD	30.2 ±2.2
Smoking history	n (%)	298 (59.2)
AF history	n (%)	104 (20.7)
DM history	n (%)	174 (34.6)
Alcohol or other illicit drug use	n (%)	8 (1.6)
Prior MI/ACS	n (%)	141 (28)
Prior PCI	n (%)	159 (31.6)
Prior CABG	n (%)	51 (10.1)
Prior stroke/TIA	n (%)	18 (3.6)
Prior CKD	n (%)	30 (6)
Prior COPD	n (%)	45 (8.9)
Prior peripheral arterial disease	n (%)	30 (6)
Prior sleep apnea	n (%)	8 (1.6)
Prior device therapy for HF	n (%)	11 (2.2)
If yes for prior device therapy for HF, specify		
CRT-D	n (%)	4 (26.7)
CRT-P	n (%)	3 (20)
ICD	n (%)	3 (20)
Pacemaker	n (%)	5 (33.3)
Primary etiology		
Dilated cardiomyopathy	n (%)	13 (2.6)
Hypertension	n (%)	116 (23)
IHD (documented by coronary angiography)	n (%)	185 (36.8)
IHD (not documented by coronary angiography)	n (%)	161 (32)
Tachycardia-induced cardiomyopathy	n (%)	1 (0.2)
Valvular heart disease	n (%)	26 (5.2)
Others	n (%)	1 (0.2)
If primary etiology is valvular:		
Aortic	n (%)	8 (30.8)
Mitral	n (%)	15 (57.7)
Tricuspid	n (%)	3 (11.5)
History of HF	Yes	469 (93.2)
History of heart failure hospitalization	Yes	224 (44.5)
Heart rate (bpm)	Mean ±SD	74 ±12
SBP (mmHg)	Mean ±SD	128 ±20
DBP (mmHg)	Mean ±SD	81 ±12

SD - Standard Deviation, BMI - Body Mass Index, HF - Heart Failure, IHD - Ischemic Heart Disease, SBP - Systolic Blood Pressure, DBP - Diastolic Blood Pressure, MI - Myocardial Infarction, ACS - Acute Coronary Syndrome, PCI - Percutaneous Coronary Intervention, CABG - Coronary Artery Bypass Grafting, AF - Atrial Fibrillation, DM - Diabetes Mellitus, CKD - Chronic Kidney Disease, COPD - Chronic Obstructive Pulmonary Disease, TIA - Transient Ischemic Attack, CRT-D - Cardiac Resynchronization Therapy with Defibrillator, CRT-P - Cardiac Resynchronization Therapy with Pacemaker, ICD - Implantable Cardioverter-Defibrillator.

Table 2: Baseline laboratory characteristics of the studied patients.

Laboratory characteristics		
Baseline hemoglobin (gm%)	Mean ±SD	12.6 ±1.8
Baseline creatinine (mg/dl)	Median (range)	1.1 (0.6 - 4.5)
Baseline eGFR (ml/min)	Mean ±SD	72 ±23
Baseline sodium (mEq/L)	Mean ±SD	139 ±4
Baseline potassium (mEq/L)	Mean ±SD	4.1 ±0.5
Random blood glucose by mg/dl (if done)	Median (range)	126 (74 - 363)
hsTroponin (if done)	Positive	99 (58.2)
NT pro-BNP by pg/ml (if done)	Median (range)	377 (161 - 1225)

NT pro-BNP - N-terminal prohormone of Brain Natriuretic Peptide.

Medications

Approximately 21.1% of patients were on Captopril, 7.4% on Enalapril, 0.8% on other ACEIs, 4.2% on Perindopril, and 31.2% on Ramipril. About one-third (35.4%) of patients were not on ACEIs. Among those not on ACEIs, 3.9% cited hyperkalemia, 3.4% low blood pressure, 72.5% were on other RAAS inhibitors, and 20.2% had renal impairment as reasons for not using ACEIs. Regarding ARBs, only a small percentage of patients were on ARBs, with 2% on Candesartan, 2.4% on Losartan, 3.6% on Olmesartan, and 7.4% on Valsartan. The majority, 84.7%, were not on ARBs. Among those not on ARBs, 1.6% cited hyperkalemia, 1.4% low blood pressure, 89.4% were on other RAAS inhibitors, and 7.5% had renal impairment as reasons for not using ARBs. Regarding ARNI, about 10.9% of patients were on ARNI, with various dosages specified. The majority, 89.1%, were not on ARNI. Among those not on ARNI, 9.8% received no RAAS inhibition, 86.8% were on other ACEIs or ARBs, and 3.3% had not heard about ARNI before Regarding Beta-blockers, a significant percentage of patients were on Beta Blockers, including 48.1% on Bisoprolol, 37.4% on Carvedilol, 8% on Metoprolol, and 2% on other Beta Blockers. Only 4.6% of patients were not on Beta Blockers, with reasons including low blood pressure, low heart rate, and continued hypervolemia.

Regarding MRAs, patients were prescribed MRAs, with 18.7% on Eplerenone and 68.2% on Spironolactone. However, 13.1% of patients were not on MRAs. Among those not on MRAs, reasons included hyperkalemia, low blood pressure, physician preference not to prescribe MRA (for specific cases), and renal impairment.

Regarding SGLT2 inhibitors, 28.4% of patients were on Dapagliflozin, and 56.5% on Empagliflozin. Only 15.1% were not on SGLT2 Inhibitors. Reasons for not using SGLT2 Inhibitors included cost issues, dehydration, high patient fragility, low eGFR, and a lack of awareness about SGLT2 Inhibitors. Regarding oral diuretics, approximately 55.1% of patients were on furosemide, 10.1% on Torsemide, 6% on other oral diuretics, and 28.8% were not on oral diuretics Rearing Ivabradine, about 25.6% of patients were on Ivabradine. Reasons for not using Ivabradine included cost issues (2.1%), heart rate less than 70 bpm when taking a beta-blocker (54.8%), not being tolerated (e.g., experiencing eye flashes) (2.9%), and being in atrial fibrillation (25.1%).

Regarding antiplatelets, two-thirds (60%) of patients were on antiplatelets, while 40% were not. Regarding oral anticoagulants, a total of 23.9% of patients were on oral anticoagulants, including Apixaban (19.2%), Rivaroxaban (53.3%), and Warfarin (27.5%). However, 76.1% were not on oral anticoagulants.

Regarding amiodarone, only 3.2% of patients were on amiodarone, while the majority (96.8%) were not on Amiodarone. Regarding digitalis, it was prescribed for 9.5% of patients, with the remaining 90.5% not on Digitalis.

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Table 3: Radiological workup of the studied patients

Radiological workup		Number of patients (503)
Abnormal ECG		
Yes	n (%)	475 (94.4)
No	n (%)	28 (5.6)
If abnormal, "major" ECG finding is		
SVT (AF)	n (%)	70 (14.7)
LBBB	n (%)	14 (2.9)
Voltage Criteria (LVH)	n (%)	31 (6.5)
Other abnormality	n (%)	176 (37.1)
Paced rhythm	n (%)	11 (2.3)
Pathological Q waves	n (%)	159 (33.5)
RBBB	n (%)	13 (2.7)
SVT	n (%)	1 (0.2)
CXR performed		
Yes	n (%)	396 (78.7)
No	n (%)	107 (21.3)
If yes for CXR, was it		
Abnormal	n (%)	136 (34.3)
Normal	n (%)	260 (65.7)
If CXR was abnormal, the major abnormality was		
Alveolar edema	n (%)	26 (19.1)
Cardiomegaly	n (%)	65 (47.8)
Pleural effusion	n (%)	45 (33.1)
LVEF in % as measured by echo	Mean ±SD	45 ±12
LVH in echo		
Yes	n (%)	136 (27)
No	n (%)	367 (73)
LA diameter in echo (cm)	Mean ±SD	4 ±0.6
LVEDD in echo (cm)	Mean ±SD	5.5 ±0.9
Moderate-to-severe MR in echo		
Yes	n (%)	104 (20.7)
No	n (%)	399 (79.3)
More than moderate MS in echo		
Yes	n (%)	9 (1.8)
No	n (%)	494 (98.2)
Moderate-to-severe AR in echo		
Yes	n (%)	14 (2.8)
No	n (%)	489 (97.2)
Moderate-to-severe AS in echo		
Yes	n (%)	7 (1.4)
No	n (%)	496 (98.6)
Moderate-to-severe TR in echo		
Yes	n (%)	68 (13.5)
No	n (%)	435 (86.5)
ePASP in echo (mmHg)	Mean ±SD	40 ±10
Coronary angiography done		
Yes	n (%)	228 (45.3)
No	n (%)	275 (54.7)
In case of coronary angiography was done, it was		
Abnormal	n (%)	176 (77.2)
Normal	n (%)	52 (22.8)
In case of abnormal coronary angiography, it was		
Left main disease	n (%)	9 (5.1)
Single vessel disease	n (%)	64 (36.4)
Three vessel disease	n (%)	50 (28.4)
Two vessel disease	n (%)	53 (30.1)
In case of abnormal coronary angiography, revascularization was attempted		
by GABG	n (%)	49 (27.8)
by PCI	n (%)	124 (70.5)
No	n (%)	3 (1.7)

ECG – Electrocardiogram, AF - Atrial Fibrillation, LBBB - Left Bundle Branch Block, LVH - Left Ventricular Hypertrophy, CXR - Chest X-Ray, LA - Left Atrium, MR - Mitral Regurgitation, MS - Mitral Stenosis, AR - Aortic Regurgitation, LVEDD - Left Ventricular End-Diastolic Dimension, AS - Aortic Stenosis, TR - Tricuspid Regurgitation, ePASP - Estimated Pulmonary Artery Systolic Pressure, GABG - Coronary Artery Bypass Grafting, PCI - Percutaneous Coronary Intervention, LVEF - Left Ventricular Ejection Fraction.

Table 4: Non-pharmacological and device-based therapies of the studied patients

Non-pharmacological and device-based therapies		
Pacemaker implantation done		
Yes	n (%)	5 (1)
No	n (%)	498 (99)
CRT (D/P) done		
Yes	n (%)	7 (1.4)
No	n (%)	496 (98.6)
ICD done		
Yes	n (%)	3 (0.6)
No	n (%)	500 (99.4)
Patient health education given		
Yes	n (%)	500 (99.4)
No	n (%)	3 (0.6)
Patient scheduled for rehabilitation		
Yes	n (%)	501 (99.6)
No	n (%)	2 (0.4)

CRT - Cardiac Resynchronization Therapy, ICD - Implantable Cardioverter-Defibrillator.

Regarding insulin, approximately 5.6% of patients were on insulin, whereas 94.4% were not. Regarding oral anti-DM, various oral anti-DM medications were used, including Glitazones (0.2%), Incretins (9.3%), Metformin (14.1%), and Sulphonylurea (4%). However, most (71.4%) of patients were not on oral anti-DM medications.

Some patients were on COPD treatments, including Beta2 agonists (5.4%) and Corticosteroids (1%). The majority (93.6%) were not on any COPD treatment.

Radiological workup

In this HF cohort from Egypt, a significant proportion of patients exhibited abnormal ECG, with 94.4% presenting abnormalities. Among these, the major ECG findings included AF in 14.7% of cases, LBBB in 2.9%, LVH in ECG in 6.5%, and other abnormalities in 37.1%. Chest X-rays (CXR) were performed in 78.7% of patients, and 34.3% had abnormal CXR results, which included alveolar edema in 19.1%, cardiomegaly in 47.8%, and pleural effusion in 33.1%. Echocardiography revealed a mean LVEF of 45±12 %, and LVH was observed in 27% of patients. The mean LA diameter in the echo was 4±0.6 cm, and the mean LVEDD was 5.5±0.9 cm. Additionally, moderate-to-severe valvular abnormalities were noted, including mitral regurgitation (MR) in 20.7%, mitral stenosis (MS) in 1.8%, AR in 2.8%, AS in 1.4%, and TR in 13.5%. The mean ePASP in echo was 40±10 mmHg. Coronary angiography was conducted on 45.3% of patients, with 77.2% having abnormal findings, including left main disease in 5.1%, single vessel disease in 36.4%, three-vessel disease in 28.4%, and two-vessel disease in 30.1%. Revascularization was attempted in cases of abnormal coronary angiography, with 27.8% undergoing GABG, 70.5% undergoing PCI, and only 1.7% not undergoing revascularization. Table 3

Non-pharmacological and device-based therapies

Pacemaker implantation was performed in a small proportion of patients, with only 1% undergoing this procedure. CRT and ICD placement were relatively uncommon, with 1.4% and 0.6% of patients, respectively, receiving these interventions. In terms of patient care, the vast majority of patients received health education (99.4%), and almost all were scheduled for rehabilitation (99.6%). Table 4

Discussion:

In relation to baseline characteristics, our findings align with the research conducted

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by some authors. In their investigation of demographics, clinical attributes, and patient outcomes among individuals hospitalized due to heart failure across diverse regions of Egypt, they enrolled a cohort of 1645 patients. Among this cohort, 68% were of male gender, while the remaining 32% were female. The mean age of their cohort was 60.1 ± 12.1 years [(4)].

Also, a research studied clinical characteristics and in-hospital outcomes of heart failure. Out of the 1006 patients admitted to the CCU within a one-year timeframe, 345 of them, corresponding to 34.2% of the total admissions, were female. In addition, among these admitted patients, 118 individuals (34.2%) displayed clinical signs of heart HF. Among the male patients, who totaled 661, 178 of them, making up 26.9% of the male subgroup, also received a diagnosis of heart failure [(10)].

Concerning the primary cause of heart failure, our findings aligned with the research conducted by another study. They reported that ischemic heart disease was the predominant etiological factor for heart failure. However, the prevalence of this causative factor displayed significant regional disparities, spanning from 40.9% in Upper Egypt to 72.5% in Alexandria ($P < 0.01$). In the Delta areas and Alexandria, dilated cardiomyopathy (DCM) ranked as the second most frequent causative factor. In Cairo, valvular heart disease and DCM jointly occupied the second position, while in Upper Egypt, valvular heart disease accounted for a quarter of the cases and was the second most common etiological factor [(4)].

In a similar vein, some authors conducted a study examining the initial findings from the acute Heart Failure registry in the DELTA region of Egypt, identified ischemic heart disease as the primary underlying etiological factor in 58.1% of patients. Dilated non-ischemic cardiomyopathy was present in 15.5% of cases, valvular heart disease was detected in 16.3% of instances, and systemic arterial hypertension was associated with 9.1% of the patients [(11)].

Likewise, a study noted that ischemic heart disease was the prevailing etiology of HF, accounting for 68.1% of cases among hospitalized individuals compared to 41% among outpatients; ($P < 0.0001$)[(12)].

Regarding the initial clinical characteristics, our study's findings closely resembled those documented by Elasfar and colleagues. They reported that 50.9% of patients had a previous history of heart failure, 48.2% had been diagnosed with hypertension, 56.3% had a history of smoking, 42.7% had diabetes mellitus, and 28.2% had coronary artery disease (with 2.7% having undergone prior CABG, 15.5% having received previous PCI, and 10.9% having a history of rheumatic heart disease, with 4.5% having undergone surgical or percutaneous valve interventions). Among the various associated health conditions, 6.4% of patients had documented instances of TIA or CVA, 26.4% had atrial fibrillation, 10.9% had been diagnosed with CKD, and 8.1% had COPD and bronchial asthma [(11)].

A study documented that around two-thirds of patients in each of the four groups had a pre-existing diagnosis of HF. Among these patients, 59% had a history of smoking, 25.1% had AF, 44.2% had diabetes mellitus, 42.1% had hypertension, and 65.9% had angina and MI (10% had a history of PCI, and 4.3% had a history of CABG). A smaller proportion of participants had a history of stroke or transient ischemic attack (7.5%), chronic kidney disease (16.6%), chronic obstructive pulmonary disease (14.1%), and peripheral arterial disease (5.1% [(4)].

In terms of medication, our findings align with another study. Before admission, patients were on various medications, including ACE inhibitors (20.9%), warfarin (24.5%), oral diuretics (54.5%), ARBs (10.9%), nitrates (21.8%), beta-blockers (24.5%), digoxin (22.7%), MRAs (21.8%), ivabradine (9.1%), amiodarone

(5.5%), aspirin (32.7%), and P2Y12 receptor inhibitors (13.6%). Upon discharge, the prescription rates were as follows: beta-blockers (50%), ACE inhibitors (63.3%), ARBs (13.3%), MRAs (52.2%), digoxin (10%), diuretics (92.2%), ivabradine (17.7%), amiodarone (14.4%), warfarin (38.3%), aspirin (48.8%), and P2Y12 receptor inhibitors (28.8%). It's worth noting that device therapy (ICD, CRT, or both) was not provided to any patients, despite some meeting criteria (LVEF < 35%, QRS width ≥150 ms, or QRS width ≥130 ms). This underutilization can be attributed to socioeconomic constraints, service availability, and physician orientation [(11)].

In a study, ACE inhibitors were prescribed to 76.4% of patients, ARBs to 10.1%, ACE inhibitors or ARBs to 86.5%, beta-blockers to 64%, MRAs to 78.7%, diuretics to 76.6%, digitalis to 36.1%, amiodarone to 11.3%, ivabradine to 7.1%, antiplatelets to 78.5%, and anticoagulants to 32.7%. CRT was indicated for 14.0% of patients, and CRT was planned for 2.5%. ICD was indicated for 6.6% of patients, and ICD was planned for 1.5% [(4)].

A study reported that loop diuretics were prescribed to 85.2% of patients, MRAs to 54.9%, ACE inhibitors or ARBs to 51.4%, beta-blockers to 29.9%, and ivabradine to 10.9% [(13)].

Regarding the prescription of SGLT2 inhibitors, some authors studied their use in patients with heart failure and reduced ejection fraction, reported an initial use of 37% (3012 patients), which progressively increased from 20.5% to 59.0% over the two years of observation (2021–2022) [(14)].

In a similar context, some researchers investigated the utilization of ARNi and SGLT2 inhibitors among individuals diagnosed with heart failure and atrial fibrillation. Their research revealed that the usage of SGLT2 inhibitors was 84.9%. Furthermore, the total frequency of ARNi utilization stood at 11% [(15)].

Regarding non-pharmacological and device-based therapies, our results were in line with a study which reported insignificant differences were observed regarding CRT, ICD and Pacemaker implantation [(16)].

Conclusions:

Ischemic heart disease and hypertension constituted the most common causes of HF. A significant percentage of patients had a history of smoking and one third of them had diabetes mellitus. A significant proportion of patients exhibited abnormal electrocardiograms. Echocardiography revealed a mean left ventricular ejection fraction of 45%. Coronary angiography was conducted on 45.3% of patients, with 77.2% having abnormal findings. 10.9% of patients were on ARNI and a significant percentage of all patients were prescribed ACEIs/ARBs, Betablockers, MRAs and SGLT2 inhibitors. Pacemaker implantation was performed in a small proportion of patients. Cardiac resynchronization therapy (CRT) and implantable cardioverter-defibrillator (ICD) placement were relatively uncommon.

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None to declare.

Author contribution

The authors contributed equally to the study.

Conflicts of interest

None to declare.

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