# Risk Factors and Prescription Pattern among Patients with Congestive Heart Failure

Sir,

Congestive heart failure (CHF) is considered a condition that impairs the ventricle's ability to fill or eject blood due to a structural or functional disorder of the heart, having a prevalence rate of 0.3%–2%.[1,2] Left-sided heart failure is most commonly caused by ischemic heart disease and hypertension (HTN), whereas right-sided heart failure is generally caused by the later stage of left-sided heart failure. These cardiac conditions may lead to mental complications, including stress and depression.[3] In India, there is less data regarding the exact prevalence and incidence of CHF.[4] Availability of these data may lead to the planning of safe and effective therapy. Drug utilization studies help in identifying the trends of the therapy for the disease.[5,6] A prescription pattern study provides an insight into the treatment compliance with hospital formulary and other guidelines.[7] Deviation and irrationality in the standard therapy will help in amending the prescribing guidelines in the hospital.[8] The clinical pharmacist plays an essential role in assessing the risk factors and drug prescription patterns.[9] Hence, this study is carried out to identify the risk factors associated with CHF and pharmacotherapy in patients diagnosed with CHF.

A prospective observational study was conducted for 6 months among patients who were diagnosed with CHF. The institutional review board approved the study before collecting the data. Both hospitalized and outpatients of either gender, aged >18 years diagnosed with CHF, were considered eligible whereas, the patients without the data on the left ventricular ejection fraction were excluded from the study. A suitable data collection form was prepared and the relevant data were collected from the enrolled patients. Written patient informed consent was obtained prior to the data collection. Patient case sheets were carefully monitored on a daily basis during the ward rounds to assess the risk factors associated with CHF, comorbidities, and the details on the pharmacological treatment were collected. The collected information was analyzed using descriptive statistics. Analysis was carried out using Statistical Package for Social Sciences (SPSS version 16.0) for windows (IBM, Statistical Package for Social Sciences (SPSS version 16.0) for windows, Bangalore, India).

Out of a total of 150 patients, the majority were male (72.7%) and the remaining 41 were female (27.3%). There were 6.7% of patients found in the age group <45 years, 68% were found in the age group between 45 and 65 years, and 25.3% were found in the age group >65 years. The mean age of the study population was found to be 59.61 ± 9.42 years. Apart from the other associated risk factors of CHF, 28% of the study population was found to be suffering from comorbidities such as urinary tract infections, benign prostatic hyperplasia, aspiration pneumonia, and HTN. In the current study, it is found that coronary artery disease (CAD) was the highest risk factor for CHF (66.7%) followed by HTN (47.3%), diabetes mellitus (40%), etc., as summarized in Table 1. Among the study population, the percentage of drugs given for the treatment of CHF was nitrates (13.38%) followed by diuretics (12.03%) and beta blockers (7.66%). The adjunctive therapy given includes antiplatelets (25.26%), statins (14.73%), anticoagulants (4.5%), and antiarrhythmics (0.75%), followed by other classes of drugs as referenced in Table 2. In this study, it is observed that most of the patients (28.67%) are treated with a four-drug regimen followed by five drugs and six drugs regimen.

The prevalence of CHF among male patients was higher than females showing that men are more susceptible to CHF than females. This aspect is assisted by the results of a study conducted by Gottdiener *et al.,* stating that the incidence of CHF is greater in men than in women.[10] The patients of age group 45–65 years were found to be more susceptible to CHF. A study conducted by Baskota *et al*., showed a similar result stating that the prevalence of CHF was higher in the age group of 46–65 years, followed by the patients in the age group of >65 years.[11] The major risk factors for CHF in the current study population were CAD followed by HTN,

**Table 1: Distribution of patients based on the pattern of risk factors**

| Risk factors | Frequency, *n* (%) |
|---|---|
| CAD | 100 (66.7) |
| HTN | 71 (47.3) |
| DM | 60 (40) |
| Renal disease | 22 (14.7) |
| COPD | 19 (12.7) |
| Anemia | 9 (6) |
| Dyslipidemia | 8 (5.3) |
| Obesity | 7 (4.7) |
| Cardiomyopathy | 6 (4) |
| Rheumatic heart disease | 5 (3.3) |
| Atrial fibrillation | 3 (2) |
| LVH | 3 (2) |
| Stroke | 3 (2) |
| Smoking | 45 (30) |
| Alcohol | 25 (16.7) |

CAD=Coronary artery disease, HTN=Hypertension, DM=Diabetes Mellitus, COPD=Chronic obstructive pulmonary disease, LVH=Left ventricular hypertrophy

**Table 2: Distribution of congestive heart failure patient based on the prescription pattern**

| Class of drugs | Prescribed number of drugs ($n=665$) | Percentage of population (%) |
|---|---|---|
| Primary drugs given for heart failure | | |
| Nitrates | | |
| Isosorbide mononitrate | 72 | 13.38 |
| Isosorbide dinitrate | 10 | |
| Nitroglycerin | 7 | |
| Diuretics | | |
| Furosemide | 22 | 12.03 |
| Spironolactone | 6 | |
| Torsemide | 52 | |
| β blockers | | |
| Nebivolol | 2 | 7.66 |
| Carvedilol | 9 | |
| Bisoprolol | 2 | |
| Metoprolol | 38 | |
| ACE inhibitors | | |
| Ramipril | 40 | 6.16 |
| Enalapril | 1 | |
| Calcium channel blockers | | |
| Amlodipine | 9 | 2.70 |
| Nifedipine | 3 | |
| Cilnidipine | 6 | |
| Digitalis | | |
| Digoxin | 15 | 2.25 |
| Beta agonist | | |
| Dopamine | 4 | 2.25 |
| Dobutamine | 6 | |
| Norepinephrine | 5 | |
| ARBs | | |
| Losartan | 4 | 0.75 |
| Telmisartan | 1 | |
| Vasodilator | | |
| Nicorandil | 2 | 0.3 |
| Adjunctive therapy for heart failure | | |
| Antiplatelet | | |
| Aspirin | 90 | 25.26 |
| Clopidogrel | 78 | |
| Statins | | |
| Atorvastatin | 90 | 14.73 |
| Rosuvastatin | 8 | |
| Nicoumalone | 6 | |
| Warfarin | 6 | |
| Heparin | 18 | |
| Antiarrhythmic | | |
| Amiodarone | 5 | 0.9 |
| α blocker | | |
| Prazosin | 4 | 0.6 |
| Combination of drugs | | |
| Aspirin + clopidogrel | 4 | 6.46 |
| Aspirin + clopidogrel + atorvastatin | 12 | |
| Aspirin + atorvastatin | 7 | |
| Clopidogrel + atorvastatin | 6 | |
| Metoprolol + ramipril | 4 | |
| Spironolactone + torsemide | 10 | |

ACE=Angiotensin-converting enzyme, ARBs=Angiotensin II receptor blockers

diabetes mellitus, smoking, alcohol, and chronic obstructive pulmonary disease. Similar results were shown in a study conducted by Thanusubramanian *et al*.[12] This was because the study included older men than women and it was evident and well proved that CAD was the highest risk factor in men. Among the drugs prescribed for the treatment of CHF, it was found that nitrates were the most commonly used followed by diuretics, beta-blockers. The drugs given for supportive care in CHF include antiplatelets, statins, and anticoagulants. However, a study conducted by Faggiano *et al*., reported that the diuretics were the most frequently prescribed therapeutic agents to 83.5%, followed by angiotensin-converting enzyme inhibitors, digoxin, and nitrates.[13]

In this study, it is vividly clear that men are more susceptible to heart failure than women and the incidence of CHF increases with age. CAD, HTN, smoking, and diabetes were the highest identified risk factors for CHF. The most frequently used drugs in the management of heart failure are nitrates, diuretics, beta-blockers, angiotensin-converting enzyme inhibitors, followed by other classes of drugs. The identification of the risk factors and the proper management of the predisposing factors will have a great impact in reducing the complications of heart failure.

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## Conflicts of interest

There are no conflicts of interest.

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