Original Research Article

# Dilated cardiomyopathy: a pharmacotherapeutic research

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**ABSTRACT**

**Background:** AHA defines cardiomyopathies as a heterogeneous group of diseases of the myocardium associated with mechanical and/or electrical dysfunction that usually (but not invariably) exhibit inappropriate ventricular hypertrophy or dilatation and are due to a variety of causes that frequently are genetic.

**Methods:** This is a prospective observational study conducted in the year 2017 at an OPD of Cardiology of a private hospital located in Telangana state, India. Data has been collected after diagnosis is made and treatment regimen is given by an Interventional Cardiologist.

**Results:** Data has been collected from 78 cardiac patients, out of which 17.9% patients had Dilated Cardiomyopathy (DCM) among them 57.14% were male. In the present study DCM was reported more in the age group of 61-70 years (42.85%). Treatment pattern in most of the prescriptions include Diuretics, Beta blockers, Angiotensin Converting Enzyme Inhibitors (ACEI), Angiotensin Receptor Blockers (ARBs), Cardiac Glycosides, Antiplatelet and Antihyperlipidaemics.

**Conclusions:** To conclude, lack of awareness among people about this disease is leading it to progress to advanced stages and prognosis of which is poor. Conducting community awareness programs can play a key component in improving the prognosis of this disease.

**Keywords:** Community awareness programs, Dilated cardiomyopathy, Prevalence, Prognosis, Treatment pattern, Ventricular hypertrophy

## INTRODUCTION

In the 1980 World Health Organization (WHO) classification, cardiomyopathies were classified as "heart muscle diseases of unknown cause", reflecting a general lack of etiologic factors which may cause heart failure. The next WHO classification published in 1995 proposed "diseases of myocardium associated with cardiac dysfunction" and included for the first time Arrhythmogenic Right Ventricular Cardiomyopathy/Dysplasia (ARVC/D), as well as primary Restrictive Cardiomyopathy (RCM).[1,2]

The official definition given by AHA in 2006 represents cardiomyopathies as a heterogeneous group of diseases of the myocardium associated with mechanical and/or electrical dysfunction that usually (but not invariably) exhibit inappropriate ventricular hypertrophy or dilatation and are due to a variety of causes that frequently are genetic.[3] Cardiomyopathies either are confined to the heart or are part of generalized systemic disorders, which may lead to cardiovascular death or progressive heart failure-related disability.[3] This definition of cardiomyopathies is similar to that reported by the European Society of Cardiology (ESC), under the auspices of the Working Group on Myocardial and Pericardial Diseases.[4]

Cardiomyopathies are classified according to morphological and functional criteria into four categories: Dilated Cardiomyopathy (DCM), Hypertrophic Cardiomyopathy (HCM), Restrictive Cardiomyopathy (RCM) and Arrhythmogenic Right Ventricular Cardiomyopathy/Dysplasia (ARVC/D).[3-5]

Dilated Cardiomyopathy refers to a spectrum of heterogeneous myocardial disorders that are characterized by ventricular dilation and depressed myocardial performance in the absence of hypertension, valvular, congenital, or ischemic heart disease.[2] It is the most common cardiomyopathy worldwide. It is a heart muscle disorder defined by the presence of a dilated and poorly functioning left or both ventricles. It can be primary (genetic, mixed or predominantly familial nongenetic, or acquired) or secondary (inflammatory, autoimmune, or thyrotoxic).[4] DCM is characterized by an enlarged and poorly contractile LV. It can be related to genetic and non-genetic causes, including hypertension, valve disease, inflammatory/infectious causes, and toxins.[6]

Alcoholic Cardiomyopathy represents one of the most common forms of secondary cardiomyopathies resembling Idiopathic Dilated Cardiomyopathy (IDC). The risk of developing alcoholic cardiomyopathy depends on both duration and doses of alcohol consumption. The clinical course and prognosis in alcoholic Cardiomyopathy in withdrawal of alcohol consumption is better compared to those with idiopathic DCM.[7,8]

Hypertrophic Cardiomyopathy is a clinically heterogenous autosomal dominant heart muscle disorder with inherited etiology, primarily by mutations of genes encoding the cardiac sarcomere myofilament proteins. HCM prevalence is 0.2% and one-third of patients show no obstruction of LV outflow tract (LVOT), whereas two-thirds develop a significant gradient under resting conditions and/or on exertion.[9]

Restrictive Cardiomyopathy is a disease of the myocardium characterized by impaired ventricular filling and reduced diastolic volume of either or both ventricles, with normal or near-normal systolic function. Myocardial relaxation abnormality with interstitial fibrosis and calcifications compose the fundamental abnormalities of restrictive cardiomyopathies.[4]

Arrhythmogenic Cardiomyopathy/RV Dysplasia is the genetic form of cardiomyopathy characterized by fibrosis and fatty infiltration of RV myocardium and by manifestation of ventricular tachycardia/ventricular fibrillation. Lately, it has been shown that the disease is not confined only to the right ventricle as the name suggests, because the left ventricle may be affected in up to 75% of patients.[10]

The aim and objective of this study is to analyze the pharmacotherapeutic approach in the treatment of patients with Dilated Cardiomyopathy (DCM) at an OPD of Cardiology.

## METHODS

This is a prospective observational study conducted during May-June 2017 at an Out-Patient Department of Cardiology of a private hospital located in Telangana, India. Prior to the collection of data, diagnosis was made, and treatment regimen was given by an Interventional Cardiologist.

### *Inclusion criteria*

### *Study population*

All the patients who visited the hospital with cardiac symptoms were included in the study and among them; patients with DCM were selected for proposed research. Other cases observed include Coronary Artery Disease (CAD), Congestive Heart Failure (CHF), Valvular Heart Disease, Corpulmonale, Hypertension, Hypertension with Type II Diabetes Mellitus.

### *Exclusion criteria*

Patients with non-cardiac chest pain such as with Acid Peptic Disease (APD) and Esophagitis were excluded from the study.

## RESULTS

Data has been collected from 78 cardiac patients, out of which 17.9% patients had Dilated Cardiomyopathy (DCM). Figure 1 shows that there is a slight male dominance of patients reporting DCM. Among the patients 57.14% were male and 42.85% were female. Table 1 describes majority of patients with DCM were reported in the age group of 61-70 years (42.85%) followed by 71-80 years (28.57%), 51-60 years (21.42%) and 41-50 years (7.14%).

**Table 1: Age group wise distribution.**

| Age group (Years) | Percentage (%) |
|---|---|
| 41-50 | 7.14% |
| 51-60 | 21.42% |
| 61-70 | 42.85% |
| 71-80 | 28.57% |

Table 2 denotes drug class based distribution; among the total number of drugs prescribed majority were combination of Loop Diuretics + $K^+$ Sparing Diuretics (20.93%) followed by single agent Diuretic (16.27%), Beta blockers (13.9%), Dual Antiplatelet + Anti hyperlipidaemic (11.62%) and Single Antiplatelet + Anti hyperlipidaemic (9.30%). ACEI and ARBs (2.32%) each were least prescribed.

**Table 2: Drug class based distribution.**

| Class of drug | Percentage | Percentage* |
|---|---|---|
| Beta blockers | 13.95% | 42.85% |
| Diuretics | 16.27% | 50% |
| Angiotensin Converting Enzyme Inhibitors (ACEI) | 2.32% | 7.14% |
| Angiotensin Receptor Blockers (ARBs) | 2.32% | 7.14% |
| Antianginal agents | 6.97% | 21.42% |
| Cardiac Glycosides | 6.97% | 21.42% |
| Beta blocker + ACEI | 4.65% | 14.28% |
| ACEI + Thiazide Diuretic | 4.65% | 14.28% |
| Loop Diuretic + $K^+$ Sparing Diuretic | 20.93% | 64.28% |
| Single Antiplatelet + Anti hyperlipidaemic | 9.30% | 28.57% |
| Dual Antiplatelet + Anti hyperlipidaemic | 11.62% | 35.71% |

Percentage: Denotes percentage of a particular drug prescribed among total number of drugs; Percentage*: Denotes percentage of a particular drug prescribed among total number of patients. (Total number of patients was taken as denominator)

Figure 2 denotes drug based category; among the total number of drugs prescribed Torasemide + Spironolactone constitutes the most (18.60%) followed by Bisoprolol (13.95%), Aspirin + Clopidogrel + Atorvastatin (11.62%), Eplerenone (9.30%) and Digoxin (6.95%). Ranolazine, Metoprolol + Ramipril, Metoprolol + Hydrochlorothiazide, Clopidogrel + Atorvastatin and Aspirin + Atorvastatin were prescribed in 4.65%.
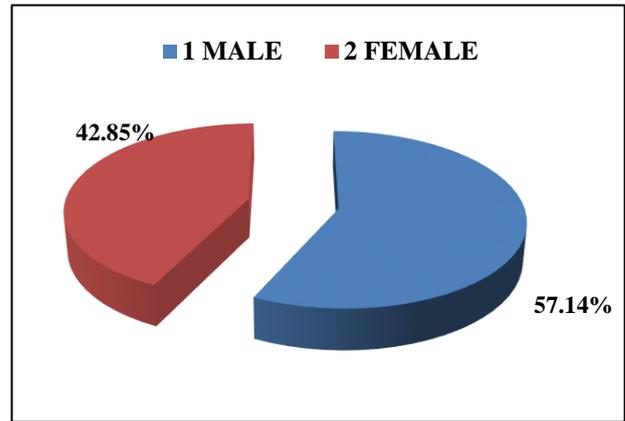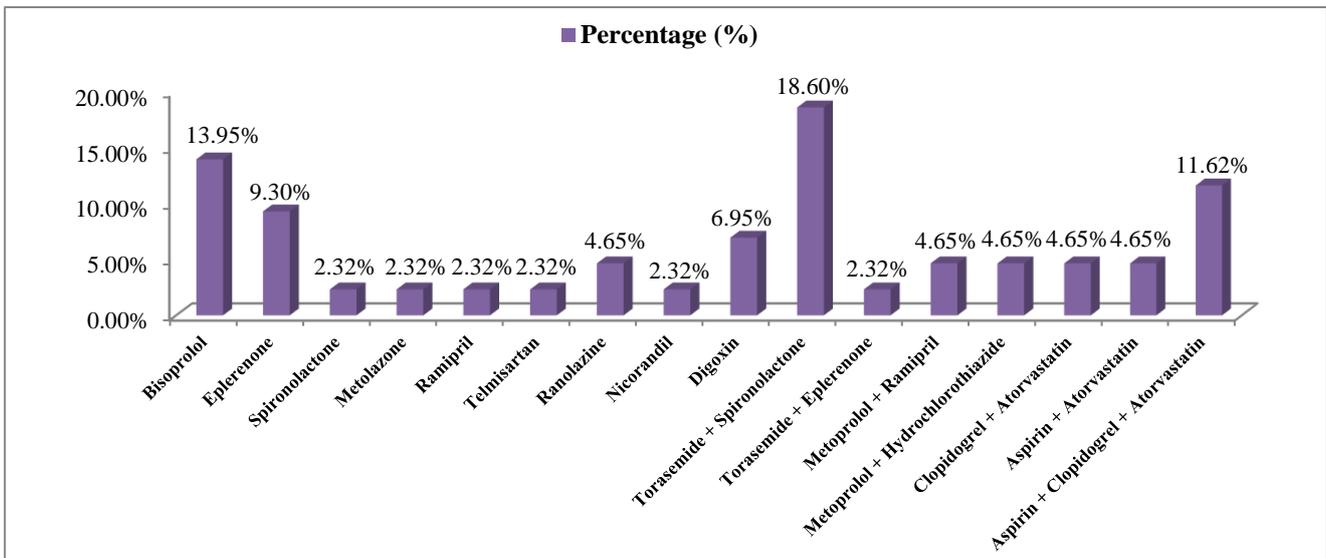


**Figure 1: Gender wise distribution.**



Percentage: Denotes percentage of particular drug prescribed among total number of drugs (Total number of drugs was taken as denominator)

**Figure 2: Drug based category.**

## DISCUSSION

In the present study the prevalence of DCM was found to be 17.9% out of which 57.14% were male and 42.85% were female. In contrast a drug utilization study conducted by Bharath DK et al in south Indian tertiary care hospital states the prevalence of DCM was 4.67% among patients with heart failure.[10] In another study conducted by Baskota M et al, in Nepal the prevalence of DCM was 25% among patients with heart failure.[11] This is quite similar to our study. These variations in prevalence rates among different studies could point towards lack of awareness about the disease among patients, since the disease course is asymptomatic for a long period.[4] In the United States the

age adjusted prevalence of DCM is 36 per 100000 population.[12]

In the present study it was noted that majority of patients with DCM were reported in the age group of 61-70 years (42.85%) followed by 71-80 years (28.57%) and 51-60 years (21.42%). 41-50 years age group had only 7.14% reported number of cases. In contrast the study conducted by Banerjee P et al, states that 48.71% population encountered in their study was aged between 50-60 years and 17.94% patients were over 60 years.[13]

As per the literature stated by Hamayak Sisakian, DCM has no specific etiology-based therapy. The general concepts of Chronic Heart Failure treatment forms a part of DCM therapy, with regard to etiopathogenesis conventional pharmacotherapy is not specific but it reduces mortality in these patients.[4] General treatment options include β-blockers, angiotensin-converting enzyme (ACE) inhibitors, Spironolactone in patients with NYHA class II - IV heart failure.[4] Similarly a study conducted by Hunt SA et al states the use of Angiotensin Converting Enzyme (ACE) Inhibitors, Angiotensin Receptor Blockers (ARB), Beta Blockers, Aldosterone Antagonists, and Vasodilators show a significant clinical benefit in patients with DCM. Unless limited by adverse effects the dose of these medications should be titrated to the one used in clinical trials as given in consensus guidelines.[14]

The treatment regimen in the present study shows a dominance of Loop Diuretic + Potassium Sparing Diuretic which has been prescribed to 64.28% patients (agents include Torasemide + Spironolactone or Torasemide + Eplerenone) followed by Single agent Diuretic (agents include Torasemide or Spironolactone or Eplerenone or Metolazone) which were given in about 50% patients. Similarly, in a study conducted by Banerjee P et al it was reported that Diuretics were prescribed to all the patients with Spironolactone being the most commonly prescribed agent.[13]

As per the study conducted by Kurtoglu E et al, among beta blockers Metoprolol or Carvedilol remains a more rational choice in these cases.[15] Similarly another study conducted by Banerjee P et al, reports Beta blocker prescriptions to be about 93.58% in their study with Carvedilol being the most commonly prescribed drug.[13] Where as in a small randomized, placebo controlled trial conducted by Yeoh T et al, in patients with suspected early familial DCM, there was no significant improvement in cardiac function with carvedilol, although benefit is suggested with longer term follow-up.[16] In contrast our study shows about 42.85% prescriptions of Beta blockers with Bisoprolol being the only prescribed agent in the patients with DCM. The reason for Bisoprolol being prescribed in this study could be its higher degree of $\beta_1$ selectivity compared to the other $\beta_1$ selective blockers.[17] Adding further, Bisoprolol inhibits renin secretion by 65% which is additional to other beta blockers.[18]

Antiplatelet and Anti hyperlipidaemics were given to 64.28% patients (agents include Aspirin or Clopidogrel along with Atorvastatin); among them Dual Antiplatelet therapy was given to 35.71% patients which is quite low compared to 92.3% Antiplatelet prescriptions (mostly Aspirin) in the study conducted by Banerjee P et al.[13]

ACEI (Ramipril) and ARBs (Telmisartan) were prescribed in only 7.14% patients each. In contrast a study conducted by Banerjee P et al states that ACEI or ARBs with Ramipril being the most common was prescribed in almost all the patients.[13] In another study conducted by Yusuf S et al, emphasizes as per HOPE trial that ACE inhibitors provide an essential cardiovascular benefit in this group of patients.[19]

Digoxin (Cardiac Glycoside) was prescribed in 21.42% patients in the present study which is higher when compared to 5.4% in a study conducted by Banerjee P et al.[13] Digoxin plays a prominent role in the management of patients with heart failure and this could be the possible reason for it being prescribed here. In a study conducted by Busseuil D et al, and in another study conducted by Tardif JC et al, the authors support the use of Ivabradine for its heart rate lowering effect.[20,21]

## CONCLUSION

This study shows that the prevalence of DCM is high among elderly people and especially high in those above 60 years of age. The treatment pattern given in this study is subjective and is purely based up on patient symptoms; hence it slightly differed from other studies. Most of the patients were diagnosed at advanced stages of the disease; as a matter of fact, the disease course is asymptomatic for a long period.

There is a lack of awareness among people about DCM which leads to patients being diagnosed at advanced stages and prognosis of which is poor. Hence there is a strong need to conduct community awareness programs about DCM among people and convince them to have their heart checked at least once a year. Since if we are able to diagnose the disease in the beginning or at early stages it could possibly lead to a well-targeted treatment and provide significant improvement in patient outcomes. Physician - Clinical Pharmacist relationship can play a major role in creating awareness about the disease in community.

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