International Journal of Science and Research (IJSR)
ISSN: 2319-7064
SJIF (2022): 7.942

# Clinical Profile of Patients with Heart Failure with Preserved Ejection Fraction Presenting to Tertiary Care Hospital in Central India

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**Abstract:** ***Background: HFpEF patients constitute about half of the patients with heart failure, the aim of this study was to study the clinical profile of patients with HFpEF. Methods: This study was cross sectional observational study carried out at a tertiary care hospital, clinical profile of 86 patients diagnosed as having HFpEF was analyzed in this study. Results: Mean age of patients was 69.81 ±7.61 years, 54.65% were females, mean BMI was 27.31 ± 5.12 kg/m$^2$, 54.65% were hypertensive, breathlessness was most common symptom present in 100% patients, raised JVP was most common sign present in 65.11% patients, 43.02% patients had grade II diastolic dysfunction. Conclusion: Understanding the clinical profile of patients with HFpEF will help in prompt diagnosis of this condition.***

**Keywords:** HFpEF, Diastolic dysfunction, heart failure

## 1. Introduction

Multiple studies have shown that about half of the patients diagnosed clinically as having heart failure have heart failure with preserved ejection fraction (HFpEF) [1, 2]. The term heart failure with preserved ejection fraction was first used in CHARM (candesartan in heart failure assessment of reduction in mortality and morbidity) trial for patients with EF> 40%, however the latest guidelines recommend EF cutoff of > 50% [3, 4]. HFpEF is not a discreate entity but rather it is a syndrome, thus there is no single etiology for HFpEF [5]. Majority of the studies suggest that patients with HFpEF have more comorbidities and are older as compared to heart failure with reduced ejection fraction (HFrEF) [6]. Structurally heart of most of the patients with HFpEFhave increased left ventricular mass and concentric left ventricular hypertrophy [7]. These patients also have increased left ventricular stiffness and impaired left ventricular relaxation [8]. Patients with HFpEF have higher mortality than individuals without heart failure, several studies have shown that mortality rates are similar for HFpEF and HFrEF [9].

We evaluated the clinical profile of patients with HFpEF in this study.

## 2. Material and methods

This study was a cross sectional observational study carried out from January 2021 to December 2021 at a tertiary care hospital in central India. This study included 86 patients>18 years of age with: clinical evidence of heart failure (Framingham criteria), Left ventricular ejection fraction >50% with no past record of reduced LVEF, evidence of diastolic dysfunction, no noncardiac causes of symptoms and signs. Written informed consent for participation in study was taken from patients and necessary data was obtained.

All statistical analyses were performed using SPSS Statistical Package version 25.0 (SPSS Inc., IBM, Armonk, NY, USA). Categorical data are presented as numbers and percentages, continuous variables are presented as mean ± standard deviation.

## 3. Results

The data collected from 86 patients in this study was analyzed.

Majority of patients in this study were females (54.65%), and most of the patients were > 60 years of age (83.71%), with about 47.67% patients belonging to age group of 60 to 75 years. [Table 1]

Mean age of patients was 69.81 ±7.61 years. [Table 2]

Body Mass Index (BMI): The mean BMI of patients in this study was 27.31 ± 5.12 kg/m$^2$ [Table 2]. About 67.43% of the patients had a BMI of >25 kg/m$^2$ (Overweight + Obese). Only 9.3% patients were underweight and 23.25% patients had a normal BMI. [Table 6]

Hypertension: Out of 86 patients included in this study 47 (54.65%) patients were hypertensive [Table5]. The mean systolic blood pressure was 138 ± 22.2 mm Hg and mean diastolic pressure was 76 ± 13.1 mm Hg. [Table 2]

Symptoms: Breathlessness was the most common symptom present in 100% of patients followed by fatigue (53.48%), h/o Paroxysmal nocturnal dyspnea (PND) (38.37%), chest pain (27.9), h/o orthopnea (24.4%) and palpitation (12.79%). [Table 3]

Physical Signs: Raised Jugular venous pressure (JVP) was the most common sign seen in 65.11% followed by rales (55.81%), pedal edema (23.25%), S3 (6.97%), S4 (2.32%). [Table 4]

Comorbidities: Hypertension was the most common comorbidity seen in 54.65% of the patients, 32.55% patients were diabetic, 16.27% patients had history of ischemic heart disease (IHD), dyslipidemia was present in 15.11% patients, chronic kidney disease was present in 13.95% patients, atrial

fibrillation was present in 13.95% patients. Many patients had more than one comorbidity. [Table 5]

Diastolic Dysfunction: 43% patients in this study had grade II diastolic dysfunction, 29.06% had grade III diastolic dysfunction and 27.9% had grade I diastolic dysfunction. [Table 7]

**Table 1:** Distribution of patients according to Age Group and Sex

| Age | Overall | Male | Female |
|---|---|---|---|
| <60 years | 14 (16.27%) | 6 | 5 |
| 60 to 75 years | 41 (47.67%) | 20 | 23 |
| >75 years | 31 (36.04) | 13 | 19 |
| Total | 86 (100%) | 39 (45.34) | 47 (54.65) |

**Table 2:** Clinical measurements

| Clinical measurement | Mean ± SD |
|---|---|
| Age (years) | 69.81 ±7.61 |
| Body mass index (kg/m$^2$) | 27.31 ± 5.12 |
| Systolic blood pressure (mm Hg) | 138 ± 22.2 |
| Diastolic blood pressure (mm Hg) | 76 ± 13.1 |

**Table 3:** Symptom profile

| Symptom | Frequency | Percentage |
|---|---|---|
| Breathlessness | 86 | 100 |
| Fatigue | 46 | 53.48 |
| h/o PND | 33 | 38.37 |
| Chest pain | 24 | 27.90 |
| h/o orthopnea | 21 | 24.4 |
| Palpitation | 11 | 12.79 |

**Table 4:** Physical Signs

| Signs | Frequency | Percentage |
|---|---|---|
| Raised JVP | 56 | 65.11 |
| Rales | 48 | 55.81 |
| Pedal edema | 20 | 23.25 |
| S3 | 6 | 6.97 |
| S4 | 2 | 2.32 |

**Table 5:** Comorbidities

| Comorbidities | Frequency | Percentage |
|---|---|---|
| Hypertension | 47 | 54.65 |
| Diabetes | 28 | 32.55 |
| h/o IHD | 14 | 16.27 |
| Dyslipidemia | 13 | 15.11 |
| CKD | 12 | 13.95 |
| Atrial fibrillation | 12 | 13.95 |
| Thyroid dysfunction | 3 | 3.48 |
| Peripheral artery disease | 1 | 1.16 |

**Table 6:** Distribution of patients according to Body mass index

| Body mass index (kg/m$^2$) | No. of Patients | Percentage |
|---|---|---|
| <18.5 (Underweight) | 8 | 9.3 |
| 18.5 to 24.9 (Normal) | 20 | 23.25 |
| 25 to 29.9 (Overweight) | 39 | 45.34 |
| >30 (Obese) | 19 | 22.09 |

**Table 7:** Distribution of patients according to grades of diastolic dysfunction

| Grade of Diastolic Dysfunction | No. of Patients | Percentage |
|---|---|---|
| Grade I | 24 | 27.9 |
| Grade II | 37 | 43.02 |
| Grade III | 25 | 29.06 |

## 4. Discussion

The mean age of patients in our study was 69.81 ±7.61 years which was similar to a large study conducted by Owan et al in which mean age of the patients was 71.7±12.1 [5]. The number of comorbidities increases with age however younger patients with HFpEF have a worse quality of life [13].

In our study HFpEF was more common in females than males which were similar to study conducted by Bhatia *et al* [1] and Lam et al [10]. Arterial and ventricular stiffness increase with age in both men and women but the increase is more in women [11], also older women are more likely to have hypertension, depression and valvular heart disease [12].

The presence of comorbidities such as hypertension, diabetes mellitus, dyslipidemia and obesity induce a systemic proinflammatory state which leads to coronary microvascular endothelial inflammation and cardiac remodeling [14]. Remodeling changes in HFpEF include hypertrophy and increased stiffness of cardiomyocyte, interstitial fibrosis which cause high diastolic left ventricular stiffness and leads to diastolic dysfunction [14]. In our study hypertension was present in 54.65% of patients, which is higher than that in the general population. Multiple large clinical trials have shown that hypertension is present in about 50 to 80% of HFpEF patients [1, 15-18]. In our study 67.43% patients had BMI of >25 i. e. they were either overweight or obese this findings were consistent with study conducted by Seo et al. in which overweight and obese groups had more impaired diastolic function compared with the normal-weight group [19]. In our study other major comorbidities associated with HFpEF were IHD, dyslipidemia, atrial fibrillation and CKD which is also seen in multiple other studies [20-22].

## 5. Conclusion

In this **s**tudy we found that HFpEF was more common in older individuals and in females. Most common presenting symptom was breathlessness and most common sign was raised JVP. Hypertension was the most common associated comorbidity. All patients had echocardiographic evidence of diastolic dysfunction.

HFpEF patients constitute almost half of the patients with heart failure and this condition should be diagnosed promptly and managed appropriately.

**Funding**: No

**Conflict of interest**: No

**Ethical approval**: The study was approved by the Institutional Ethics Committee

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