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COMPARITIVE STUDY OF EJECTION FRACTION BETWEEN MIDDLE AGED AND ELDERLY MALES AND FEMALES (AGE GROUP 40-70 YEARS)

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ABSTRACT: BACKGROUND: Although gender-specific criteria are common for defining cardiac traits such as left ventricular hypertrophy, left ventricular ejection fraction (LVEF) thresholds widely used in clinical practice have traditionally been the same for women and men, perhaps because it remains uncertain whether there is a systematic difference in LVEF between genders. Ejection fraction (EF) is the fraction of outbound blood pumped from the heart with each heartbeat. It is commonly measured by echocardiogram and serves as a general measure of a person's cardiac function. The aim of this study is to compare the ejection fraction (EF) of the heart between middle aged and elderly males and females. **METHODS AND MATERIALS:** This study includes 100 subjects of which 50 are males and 50 females (of age group between 40 yrs-70 yrs) attending the Cardiology OP, King George Hospital affiliated to Andhra Medical College, Visakhapatnam. Ejection Fraction was measured by 2D Echo. Results are analysed and compared. **RESULTS AND DISCUSSION:** In the present study of male and female study population, 38%(19) belong to age group 40-49yrs, 58% (29) belong to 50-59yrs, and 4% (2) belong to 60-69 yrs. 4 females and 9 males are having EF <50% and 46 females and 41 males are having EF>50%. **CONCLUSION:** There is no significant difference between males and females with EF<50% and >50%.

KEYWORDS: Ejection Fraction, Echocardiogram, Heart.

INTRODUCTION: Ejection fraction (EF) is the fraction of outbound blood pumped from the heart with each heartbeat. It is commonly measured by echocardiogram and serves as a general measure of a person's cardiac function. Ejection fraction is commonly measured by echocardiography, in which the volumes of the heart's chambers are measured during the cardiac cycle. Ejection fraction can then be obtained by dividing the volume ejected by the heart (stroke volume) by the volume of the filled heart (end-diastolic volume).¹ Ejection fraction can also be measured by computed tomography (CT scan), magnetic resonance imaging (MRI), ventriculography, gated SPECT and radionuclide angiography (MUGA) scanning. A MUGA scan involves the injection of a radioisotope into the blood and detecting its flow through the left ventricle. Historically, the gold standard for measurement of the ejection fraction is ventriculography.

Healthy individuals typically have ejection fractions between 50% and 65%.² However, normal values depend upon the modality being used to calculate the ejection fraction, and some sources consider an ejection fraction of 55% to 75% to be normal. Damage to the muscle of the heart (Myocardium), such as that sustained during myocardial infarction or in atrial fibrillation or a plurality of etiologies of cardiomyopathy, compromises the heart's ability to perform as an efficient pump (ejecting blood) and, therefore, reduces ejection fraction. This reduction in the ejection fraction can manifest itself clinically as heart failure. A low ejection fraction has its cutoff below 40% with symptomatic manifestations constant at 25%.³ In the USA, a chronically low ejection fraction less

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than 30% is qualifying support for eligibility of disability benefits from the Social Security Administration.⁴

The left ventricle is the heart's main pumping chamber, so ejection fraction is usually measured only in the left ventricle (LV). An LV ejection fraction of 50 percent or higher is considered normal.^{5,6,7} An LV ejection fraction of below 50 percent is considered reduced. Experts vary in their opinion about an ejection fraction between 50 and 55 percent, and some would consider this a "borderline" range. It is said that ejection fraction is just one measure of heart function. Even with a normal ejection fraction, overall heart function may not be normal.⁸

METHODS AND MATERIALS: The present study includes 100 subjects of which 50 are males and 50 females (of age group between 40yrs-70yrs) attending the Cardiology OP, King George Hospital affiliated to Andhra Medical College, Visakhapatnam. All the subjects are excluded from Hypertension, and Diabetes by doing a protocol of investigations. Ejection Fraction was measured by 2D Echo.

Measuring EF: EF is typically measured by a simple, painless test called an echocardiogram. A special imaging machine uses sound waves to create a videotaped image of the heart, showing the four chambers of the heart, the valves and how well the heart is pumping. Most often, the left ventricle, the heart's main pumping chamber, is measured during an echocardiogram. A normal left ventricular ejection fraction (LVEF) is 50 to 75 percent. Other tests used to measure EF include cardiac catheterization, magnetic resonance imaging (MRI), computed tomography (CT), and nuclear medicine scans.

Ejection Fraction Numbers:	
50-75%	Heart's pumping ability is Normal
36-49%	Heart's pumping ability is Below Normal
35% and Below	Heart's pumping ability is Low

Figure 1

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A Low EF: Low EF number is an early sign of heart failure. This is a condition where the heart does not pump enough blood to the rest of the body. With treatment, many people live well with heart failure. If you have a low EF number, it is important that you recognize the signs of heart failure, which may include:

- Fatigue (feeling tired all the time).
- Shortness of breath.
- Swelling in the feet.

A low EF can also cause a very rapid heartbeat, which can make the heart, pump ineffectively. Echo Machine—Philips company, Model No: iE33 2DEcho is used in this study to measure EF.

Figure 2

RESULTS:

Age Group	Frequency(n)	Percentage (%)
40-49yrs	19	38%
50-59yrs	29	58%
60-69yrs	2	4%
		100%

Table 1: Showing distribution of female study population according to age group

Age group	Frequency(n)	Percentage (%)
40-49yrs	19	38%
50-59yrs	29	58%
60-69yrs	2	4%
		100%

Table 2: Showing distribution of male study population according to age group

Group	EF <50%	EF >50%	Total
Females	4	46	50
Males	9	41	50
Total	13	87	100

Table 3: Showing distribution of study population according to Ejection Fraction

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P (probability) Value: 0.234-There is no Significant difference between males and females with EF<50% and >50%.

DISCUSSION: In India, growth of the ageing population is faster than the general population. The elderly population in Asia will rise from 50% to 58% of world's elderly population by the end of 2025. The elderly females are the fastest growing population. The growth of aged females will increase to four fold of the current figure by 2025.

The present study is carried on 100 subjects (age group 40-70yrs) of which 50 are males and 50 are females. All the subjects underwent a set of investigations to exclude them from Hypertension and Diabetes. In the present study keen emphasis has been paid to evaluate any differences in EF between middle aged and elderly males & females. Comparison of EF was done between the males and females of the study group. Highest percentage of the study group was having the normal EF and there is no significant difference in the EF between the males and females of the study group.

Comparing to the studies of William C. Little (2008), who reported that normal EF is found especially in elderly females, despite the heart failure which is explained below.

It has been recently recognized that a substantial and increasing proportion of patients with heart failure have a normal ejection fraction (>50%). Such patients are typically elderly women. However, over the last decade, it has become clear that many patients with heart failure do not have a reduced EF. Instead, their EF is in the normal range (>50%). Such patients with heart failure and a normal EF have been termed as having diastolic heart failure. In contrast, heart failure and a reduced EF have been termed systolic heart failure. Patients with diastolic heart failure are more commonly women, elderly. The incidence of diastolic heart failure is increasing, and such patients may now make up the majority of patients admitted with heart failure.⁹

Since patients with diastolic heart failure have a normal EF, it is possible that they may not have "real" heart failure; their symptoms may be due to lung disease, obesity, anemia and/or deconditioning and not due to a cardiac abnormality. To address this issue, he evaluated patients with mild to moderate heart failure in association with normal and reduced EFs and compared these patients to age-matched controls.¹⁰ He found that the pathophysiologic characteristics of patients with diastolic and systolic heart failure were similar. Furthermore, we have found that the clinical and radiographic findings are similar in diastolic and systolic heart failure.^{11,12} He concludes that the syndrome of heart failure is the same whether associated with a normal or reduced EF.

CONCLUSION: Most of the subjects of our study group are having normal EF and there is no significant difference in the EF between males and females of the study group. Despite the normal EF, we cannot exclude them from heart failure especially diastolic heart failure for which more study has to be done on the study group.

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