

## Prevalence of Systolic and Diastolic Ventricular Dysfunction in Nangarhar University Teaching Hospital

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### ABSTRACT

**Background:** Heart failure occurs when the heart cannot efficiently circulate blood throughout the body. Due to the increasing use of echocardiography, a brand-new condition called heart failure has developed. CAD is the most common cause of heart failure. Patients with left heart failure may have dyspnea, even after rest, fatigue, weakness, cough, inability to sleep lying flat, reduced cardiac output, and increased pulmonary venous pressure. Heart failure affects around 6.2 million people in the US, and by 2030, it is expected to affect at least 8 million people. Ten percent of people over the age of 80 have heart failure. Our aim was to determine systolic and diastolic heart failure in Nangarhar University teaching hospital in the medical ward.

**Methods and Materials:** It is a cross-sectional hospital-based study carried out in the Nangarhar University Teaching Hospital of Internal Medicine ward in 2000 on heart failure from 2021 to 2022, which represents 323 patients.

**Findings:** We studied 2000 heart failure patients in Nangarhar University teaching hospital from 2021 to 2022, which represents 323 patients. In terms of gender, 153 (47.36%) patients were female and 170(52.63%) patients were male. In terms of age, 190(58.82%) patients were over 50 years old and 133(41.17%) patients were under 50 years old. The STDEV age was (57±11). 190(58.82%) patients had diastolic dysfunction, 133(41.17%) had systolic dysfunction, and 64(19.81%) had combined systolic and diastolic dysfunction. 198(61.10%) had a preserved ejection fraction and 125(38.69%) had a reduced ejection fraction. 160(49.53%) patients had shortness of breath, 163 (50.46%) patients had chest pain, and 38(11.74%) patients had combined shortness of breath and chest pain.

**Conclusion:** It is a cross-sectional study fulfilled in the internal medicine ward of Nangarhar University Teaching Hospital. The prevalence of heart failure is lower in females (153) (47.36%) than in men (170(52.63%).According to the age group, heart failure is more common in over-50-year old patients 190 (58.82%).

The overall prevalence of diastolic heart failure is 9.5% and systolic heart failure overall prevalence is 6.65%. Diastolic dysfunction 190(58.82%) is more common than systolic dysfunction 133(41.17%).Chest pain 163(50.46%) is more than shortness of breath of 160(49.53%).The ejection fraction is preserved in 198(61.30%) patients and reduced in 125(38.69%). Heart failure is diagnosed with clinic and echocardiography.

**Keyword:** Heart failure; Ejection Fraction; Systolic Dysfunction; Diastolic Dysfunction; Age

## INTRODUCTION

The words "congestive heart failure" and "heart failure" are frequently used interchangeably. Congestive symptoms including dyspnea, orthopnea, neck vein enlargement or pulmonary or peripheral edema nearly always signify high right or left ventricular filling pressures. These elevated pressures can be the result of diastolic dysfunction or primary systolic failure (Grossman, 1991). Congestive heart failure (CHF) is a clinical condition with recognized signs and symptoms. Patients with CHF usually receive echocardiography in order to quantify the ejection fraction (EF) and establish whether their systolic function is reduced (systolic CHF) or preserved (diastolic CHF). In addition to determining the EF, comprehensive Doppler echocardiography may now characterize diastolic function directly (Redfield and Jacobsen, 2003). Because there are many patients with heart failure in the university teaching hospital and the incidence of systolic and diastolic heart failure is not known, therefore, we chose this research to find out the incidence of this disease. Because each of this problem has different treatment plan and outcome.

Heart failure (HF), a prevalent condition with multiple underlying causes, can cause the ejection fraction to drop (EF). Numerous studies have been conducted on the pathophysiology of HF with lower EF, and effective management techniques are widely accepted (Bursi, and Weston, 2006). Although clinical series, observational data, and clinical investigations have increased our understanding of HF and preserved EF 2, 3, there is still disagreement over a number of critical elements of this condition, including its incidence, clinical characteristics, and prognosis (Bursi, and Weston, 2006). No studies that we are aware of have looked at the prevalence and distribution of diastolic dysfunction in individuals with HF and reduced or retained EF have been published. Congestive heart failure (CHF) is growing to be a significant global public health concern. Bursi, and Weston, 2006).

Diastolic heart failure has become a recognized medical condition as a result of the extensive use of echocardiography in the diagnosis of CHF. The authors studied all Olmsted County residents receiving medical care for HF at Mayo Clinic inpatient and outpatient facilities. Many people who have a clinical diagnosis of heart failure fit within this category. Heart failure is a condition that affects many people and has a wide range of etiologies. Its ejection fraction could be increased or decreased (EF). Numerous studies have been conducted on the pathophysiology of HF with lower EF Bursi, and Weston, 2006). A frequent syndrome with increasing prevalence and incidence is heart failure. Heart failure currently affects 6.2 million people in the US, and by 2030, it's predicted that figure will at least increase to 8 million. In the US, hospitals release 809,000 individuals with a diagnosis of heart failure each year. More than 75% of new and continuing cases involve people over the age of 65, indicating that it is mainly an aging disease. Patients with heart failure make up 75% of those with the illness. Less than 1% of adults between the ages of 60 and 80 have heart failure. The majority of individuals exhibit both right-and left-sided failing symptoms or indicators (Bursi and Weston, 2006).

Systolic heart failure is most frequently caused by CAD in the UK, and it can lead to MI. Systemic hypertension is more common in the US and worsens the condition as well as LV or biventricular dilatation and wide systolic failure are characteristics of dilated or congestive cardiomyopathy (Bursi and Weston, 2006). Viral myocarditis, including HIV infections, is the most frequent cause. Infiltrative illnesses, metabolic disorders, cardiotoxins, and drug toxicity are examples of rare causes. LV or biventricular dilatation and wide systolic failure are hallmarks of dilated or congestive cardiomyopathy. Viral myocarditis, including HIV infections, is the most frequent cause. Infiltrative infections, metabolic conditions, cardiotoxins, and drug toxicity are examples of rare causes (Bursi

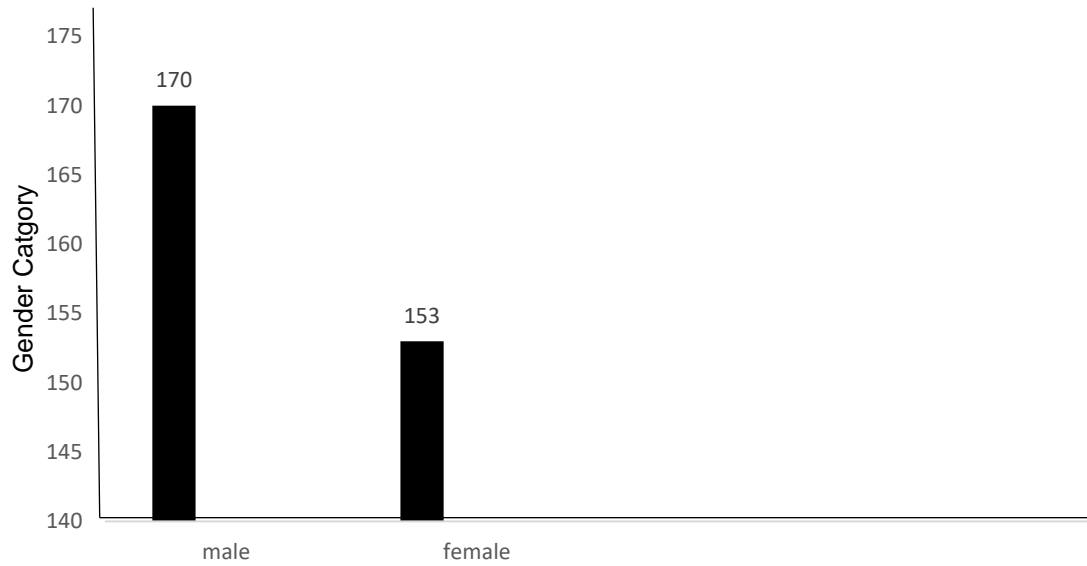
and Weston, 2006). Diastolic or systolic myocardial failure is the most common type of heart failure. Pressure-volume correlations in the left ventricle are the best indicator of a possible problem. Diastolic dysfunction could be the only physiologic disturbance or the dominant one (Warren & Grossman, 1991). Reduced cardiac output and increased diastolic filling pressure at rest and/or during activity are hemodynamic symptoms of cardiac insufficiency. Increased initial tension of muscle fibers (Frank-Law) Starling's or a sign of decreased myocardial compliance because the increase in diastolic filling pressure, that compensates for cardiac output (<https://pubmed.ncbi.nlm.nih.gov/8351672/>). Hemodynamic signs of heart failure include decreased cardiac output and increased diastolic filling pressure at rest and/or during exercise. An increase in the initial tension of the muscle fibers indicates systolic insufficiency. Diastolic congestive heart failure is frequently accompanied by decreased ventricular compliance and normal stroke function. (Federmann & Hess, 1994). Our aim was to determine systolic and diastolic heart failure in Nangarhar University teaching hospital in the medical ward.

### **MATERIALS AND METHODS**

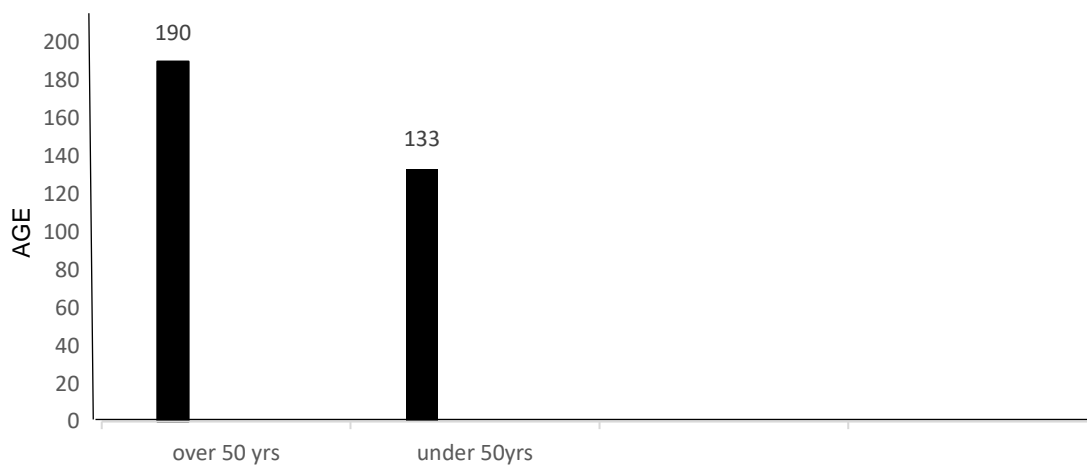
It is a cross-sectional hospital-based study carried out in the Nangarhar University Teaching Hospital of Internal Medicine ward from 2021 to 2022 in 2000 on heart failure, which represents 323 patients. First, we took the history and physical examination of the patients of our selected sample. Then, according to the format of the prepared questionnaire, we did the history and physical examination. Then we performed the echocardiography on the patients. Data collection was from patient files, echocardiographic registration and medical records of the hospital. Data analysis was done with excel and IBM SPSS statistic 26. Examinations of Echocardiography is free in Hospital. In this research, all the patients who had heart failure in terms of history and physical examination of the clinical record were included.

### **RESULTS**

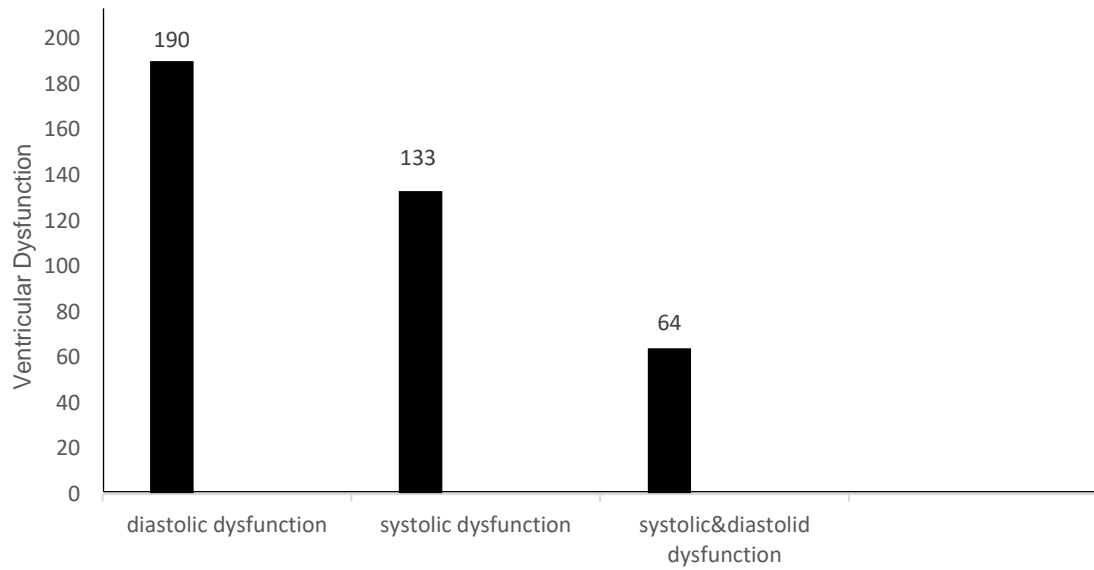
We considered 2000 heart failure patients in Nangarhar University teaching hospital from 2021 to 2022, which represents 323 patients. In terms of gender, 153 (47.36%) patients were female and 170(52.63%) patients were male. In terms of age, 190(58.82%) patients were over 50 years old and 133(41.17%) patients were under 50 years old. The STDEV age was  $(57\pm 11)$ . 190(58.82%) patients had diastolic dysfunction, 133(41.17%) had systolic dysfunction, and 64(19.81%) had combined systolic and diastolic dysfunction. 198(61.10%) had a preserved ejection fraction and 125(38.69%) had a reduced ejection fraction. 160(49.53%) patients had shortness of breath, 163 (50.46%) patients had chest pain, and 38(11.74%) patients had combined shortness of breath and chest pain. The overall prevalence of diastolic heart failure is 9.5% and systolic heart failure overall prevalence is 6.65%.



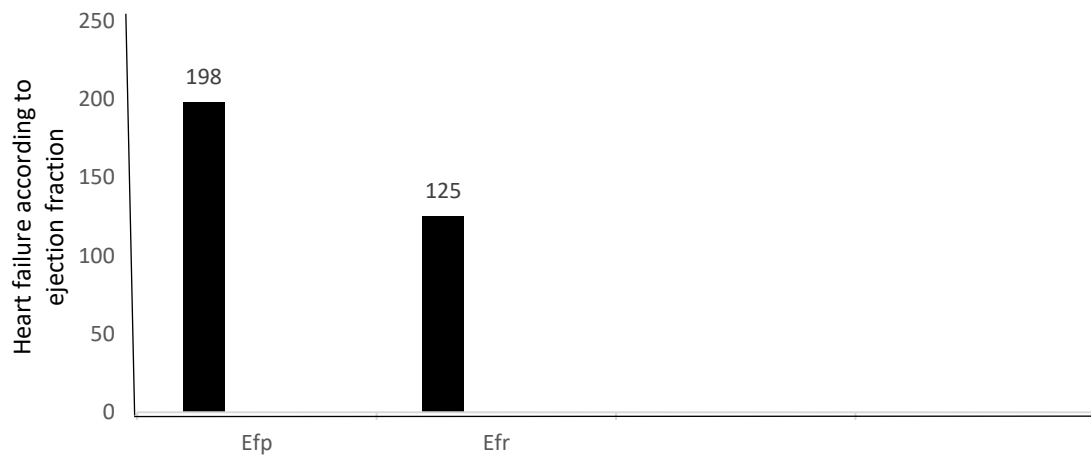
**Fig. 1.** Prevalence of Systolic and Diastolic Ventricular Dysfunction in Nangarhar University Teaching Hospital in Internal Medical Ward. Male prevalence was higher as compared to Female.



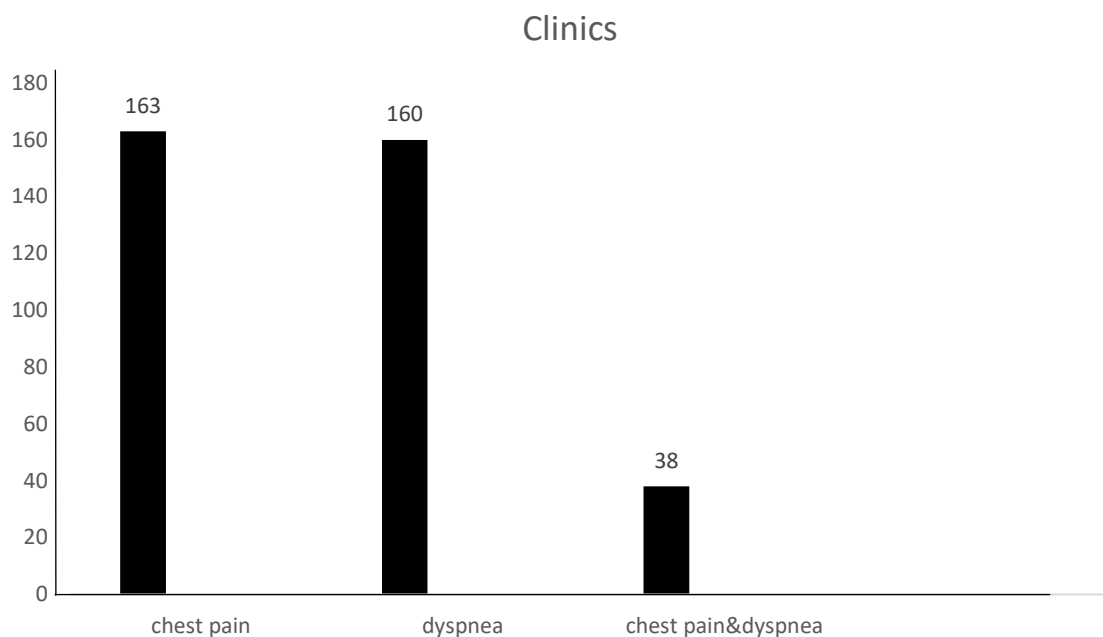
**Fig. 2.** Prevalence of Systolic and Diastolic Ventricular Dysfunction in Nangarhar University Teaching Hospital in Internal Medical Ward. Over 50 Years prevalence was higher as compared to under 50 Years old.



**Fig. 3.** Prevalence of Systolic and Diastolic and Systolic and diastolic Ventricular Dysfunction in Nangarhar University Teaching Hospital in Internal Medical Ward. The Prevalence of diastolic was higher as compared to systolic dysfunction.



**Fig. 4.** Prevalence of preserved ejection fraction (HFpEF) and reduced ejection fraction (HFrEF) heart failure



**Fig. 5.** Symptoms and signs of heart failure according to Clinics report

## DISCUSSION

Our goal is to assess the heart's insufficiency by measuring systolic and diastolic ventricular dysfunction in the medical ward of the Nangarhar University Teaching Hospital. From 2000 heart failure patients we simply selected 323 people, the Diastolic dysfunction was present in 190 patients (58.82%) and systolic dysfunction in 133 patients (41.17%). 160 patients reported shortness of breath and 163 patients had chest discomfort. In terms of age, 190(58.82%) patients were over 50 years old and 133(41.17%) patients were under 50 years' old. From this, it was found that the incidence of diastolic heart dysfunction is more than that of systolic heart dysfunction, and the incidence of heart failure is more in the elderly. Preserved ejection fraction were more than reduced ejection fraction. We compared the research of our relatives with others and it was seen that diastolic heart dysfunction is more common than systolic dysfunction and the incidence of heart failure is high in elderly people because the incidence of hypertension, cardiac ischemia, blood lipid disorders, and heart arrhythmia is high in elderly people. There were no limitations in data collection, sampling selection, and data analysis. The Preserved EF was associated with older age, female sex and no history of myocardial infarction. Diastolic dysfunction with preserved EF was present in 242 (44%) patients. For patients with reduced EF, moderate or severe diastolic dysfunctions were more common (Bursi, and Weston, 2006). In the Switzerland, 44% of the population had a diastolic dysfunction (EF) above 50%, with 44% having an EF higher than 50%. The incidence of confirmed CHF was 2.2% (95% confidence interval [CI], 1.6%-2.8%) (Redfield and Jacobsen, 2003). The Diastolic dysfunction was more common in patients with reduced EF than in those with intact EF, according to a study by Cardiologists at the University of Bristol (Bursi, and Weston, 2006). The prevalence of normal ventricular systolic function among patients with congestive heart failure ranges widely from 13% to 74%. Diastolic heart failure has identical clinical signs and symptoms. The stated annual mortality rate does too, from 1.3% to 17.5% (Vasan and, Benjamin, 1995). The Echocardiographic Study of Latinos (ECHO-SOL) selected a total of 1818 patients from across the United States between the ages of 45 and 74. Participants underwent a rigorous echocardiography examination to find left ventricular systolic dysfunction (LVSD), prevalence was 3.6%, whereas LVDD was detected in 50.3%.

(Hardik and Anderson, 2016). The Compared to people with normal heart function, CHF was substantially more frequent in people with systolic or diastolic dysfunction. Overall, 6.6% of patients had any type of dysfunction, and 2.0% had moderate or severe dysfunctions (Margaret and Redfield, 2003). The Overt congestive heart disease (CHF) patients who have diastolic dysfunction without a reduced ejection fraction compensate approximately half of the population. (EF) Nevertheless, it is still unknown how prevalent diastolic dysfunction is in the general public or how it is linked to systolic dysfunction and CHF (Redfield, and Jacobsen, 2003). The LV dysfunction was assessed using this double and Doppler echocardiography. Overall, 1.3% (or 13.7 million) of the adult Chinese double and Doppler echocardiography. Overall, 1.3% (or 13.7 million) of the adult Chinese population aged 35 or older had HF, 1.4% of individuals had LV systolic dysfunction (ejection fraction 50%), and 2.7% had LV diastolic dysfunction classified as "moderate" or "severe. (Hao, and Wang, 2019). The isolated left ventricular (LV) diastolic dysfunction has been estimated to be responsible for up to one-third of the occurrences of heart failure (HF), with an increasing prevalence in the senior population. Overall, 102 patients (78%) showed prevalent LV systolic dysfunction (LV ejection fraction 45%), while 29 patients (22%) had isolated LV diastolic dysfunction (Badano, and Albanese, 2004). Higher altitude is associated with an increased risk of LVDD in those who live above 1500 meters, particularly in men (Zheng and Wang, 2021). The Prevalence of heart failure and systolic ventricular dysfunction in older Australians: the Canberra Heart Study (Abhayaratna et al., 2006).

## CONCLUSION

The prevalence of heart failure is lower in females (153) (47.36%) than in males (170) (52.63%). The ejection fraction is preserved in 198(61.30%) patients and reduced in 125(38.69%) patients. Heart failure is diagnosed by clinic and echocardiography. The overall prevalence of diastolic heart failure is 9.5% and systolic heart failure overall prevalence is 6.65%. Diastolic dysfunction is more than systolic dysfunction, and the incidence of heart failure is higher in elderly patients. Heart disease is a leading cause of death, but it's not inevitable. While you can't change some risk factors — such as family history, sex, or age — there are plenty of ways we can reduce the risk of heart disease. We can prevent heart disease by living a heart-healthy lifestyle. Here are strategies to help us protect our heart. We'll stop smoking or using smokeless tobacco. Aim for at least 30 to 60 minutes of activity daily. Eat a heart-healthy diet. Maintain a healthy weight. Get good quality sleep. Manage stress well. Get regular health screenings. Support in daily cardiology patient management. Primary prevention is usually aimed at people who already have developed cardiovascular risk factors, such as high blood pressure or high cholesterol. As with secondary prevention, primary prevention focuses on controlling these risk factors with making healthy lifestyle changes and, if needed, taking medications.

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