Indian Journal of Health Care, Medical & Pharmacy Practice Vol 4; Issue 1, Jan-June 2023, ISSN 2583-2069

Research Article

Clinico-epidemiological Profile of Geriatric Patients Presenting With Heart Failure: A Hospital Based Study.

Dr. Shantanu Vats[1*], Dr. Eshan Sharma[1]

1 Department of General Medicine, NIMS Hospital, NIMS University Rajasthan, Jaipur, India

Corresponding Author*: Dr. Shantanu Vats, Department of General Medicine, NIMS Hospital, NIMS University Rajasthan, Jaipur India.

Email ID: shantanu2837@gmail.com

Doi: https://doi.org/10.59551/IJHMP/2023.4.4

Received: 16 March, 2023, Decision for Acceptance: 3 April, 2023

Abstract:

Introduction: Heart Failure (HF) is a chronic complex clinical condition that results from any structural or functional (systolic or diastolic) impairment of ventricular filling or ejection of blood. It has currently increased in prevalence with 64.34 million cases, accounting for 9.91 million years of healthy life lost due to disability (YLDs). **Aim:** This research was conducted to study the clinico-epidemiological profile of heart failure in geriatric patients. **Materials & Methodology:** The present hospital based study was conducted for a period of 18 months, among all patients above 60yrs of age presented to OPD or admitted in medicine department, NIMS, as a case of Heart failure. Follow up was done till the study end points. **Results:** Total of 100 patients were included in the study, who fulfilled the inclusion criteria. The median age of patients was found to be71.77±0.72 years, among which 58.6% are male. There was significant association of Heart failure with ejection fraction & Systolic HTN. **Conclusion:** We concluded that age, BMI, Heart Rate, economic status and serum creatinine are significant factor in predicting the incidence of heart failure in the geriatric patients.

Keywords: Hypertension, Heart Failure, Geriatric Patients, BMI

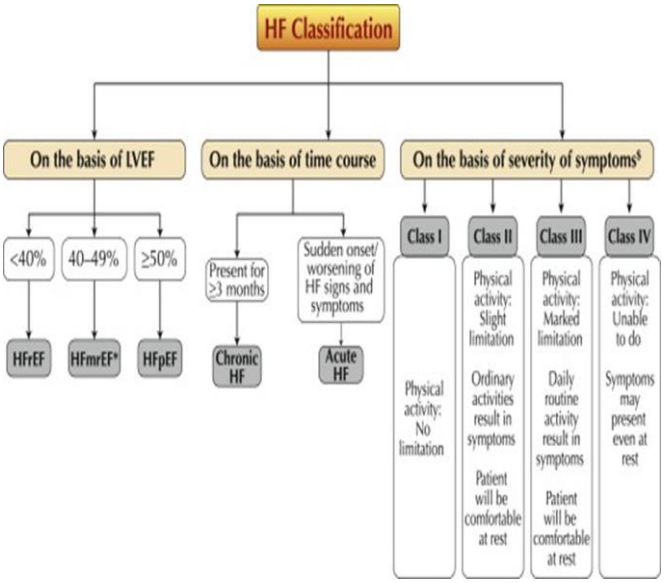
Introduction:

Heart Failure (HF) is a chronic complex clinical condition that results from any structural or functional (systolic or diastolic) impairment of ventricular filling or ejection of blood [1]. HF is further classified based on the left ventricular ejection fraction (LVEF) into HF with reduced ejection fraction (HFrEF) [LVEF<40], HF with mid-range ejection fraction (HFmrEF) [LVEF= 40-49%], and HF with preserved ejection fraction (HFpEF) or diastolic HF [LVEF≥50%] [2]. HF adversely affects patients' health, quality of life, and life expectancy as well as it is an economic burden on the healthcare system. According to some evidences, it has been recognized as a global public health issue (3).

HF has currently increased in prevalence with 64.34 million cases, accounting for 9.91 million years of healthy life lost due to disability (YLDs). YLDs have been increased by 3.9-4.5% in very older adults, especially after the age of 60 years and males have a high propensity for YLDs [4-6]. In India, due to the absence of a proper disease surveillance system, there is a scarcity of data on HF. Although the indicators presume that the incidence and prevalence of HF in India are hiking due to the epidemiological and health transitions [7]. As per the findings of Huffman and Prabhakaran, the most frequent risk factors of HF with known etiology, based on disease-specific projections are coronary heart disease, and ischemic heart disease, followed by hypertension, diabetes, rheumatic heart disease that range from 1.3-4.6 million, with an annual incidence of 0.4-1.8 million [8].

In the current study, we have assessed the clinic-epidemiological profile of heart failure patients in elderly age group.

Classification of Heart Failure: Heart Failure can be classified on the basis of left ventricular ejection fraction (LVEF), time course, and severity of symptoms. Although, physicians usually classify heart failure on the basis of severity of the patient's symptoms [1, 9] shown in **figure 1**.



Epidemiological Status:

Global Data:

Some of the population figures suggested that between 2000 and 2010 the epidemiologic burden of HF may have dropped dramatically [10], this trend could not be established in other continental or nationwide surveys, which instead showed that both the incidence and prevalence of HF may be rising, possibly as a result of a continuously increasing proportion of the population aged 70 or older [11]. Since HF affects over 26 million individuals worldwide, it has been classified as a global pandemic [12].

Indian Data:

According to estimates, there were between 1.3 million and 4.6 million cases of HF in 2000 attributable to CHD, hypertension, obesity, diabetes, and RHD combined, with an annual incidence of between 491 600 and 1.8 million cases [13]. Both estimates are expected to increase and leave out additional significant HF causes include

pericardial disease, endomyocardial fibrosis, alcoholic, familial, hypertrophic, and idiopathic dilated cardiomyopathies. For the Indian subcontinent, there are no systematic data gathering methods for cardiac mortality and morbidity, and the bulk of fatalities take place at home without the precise cause of death being known. In India in 2016, CVDs were responsible for 28.1% of all fatalities and 14.1% of all disability-adjusted life years (DALYs), compared to 15.2% and 6.9%, respectively, in 1990 [14]

Heart failure is the most frequent cardiac reason for hospitalization, affecting 1% of the general population yearly, or 8–10 million individuals. When only the 65–79 age groups is taken into account, when heart failure-related hospitalization is 5–10%, the 1% average for the general population seems different. Hospitalization rates for older adults over 80 are much higher (10–20%) [15].

Expected outcome: We can assess the various risk factors that possibly affect the prognosis of the heart failure in elderly patients.

MATERIALS AND METHODS

Study Site:

The study was carried out at the department of General Medicine of a tertiary care hospital, National Institute of Medical Sciences and Research, Jaipur, Rajasthan, India.

Study Design:

Single-centre, prospective hospital-based study.

Study Duration: 18 months.

Study Sample:

Sample size was calculated using following formula at 95% level of confidence interval and 5% margin of error (ε).

Sample size n′ is given by:-

$$n = \frac{z^2 * p * (1-p)}{d^2}$$

Therefore,

$$n = \frac{(1.96)^2 * 0.59 * (1-0.59)}{(0.08)^2}$$

n = **145**

Where z is the z-score = 1.96; inverse normal value at 5% level of significance.

p = 59% prevalence rate, d = Precision

As per sample size calculation, estimated sample size was 145.

Inclusion Criteria:

- Both male and female patients aged above 60 years.
- Patients having heart failure as per Boston Criteria of Diagnosing Heart Failure.
- Patients, willing to participate in the study by signing the informed consent form.

Exclusion Criteria:

- Patients who were not willing to give written informed consent.
- Patients with Chronic Obstructive Pulmonary Disease (COPD).
- Patients having chronic kidney disease (CKD).

A total of one hundred forty-five (n = 145) random patients who were hospitalized for ADHF as well as satisfied our inclusion and exclusion criteria were selected for the study. The Institutional Ethical Committee granted ethical approval. Prior to the data collection. Eligible geriatric patients of Heart Failure enrolled in the study after obtaining a written, informed consent for the same. Thorough & detailed medical history and clinical examination were done for all the patients. Boston criteria were used for screening the patients for Heart Failure.

Investigations:

- CBC
- Renal Function Test
- Serum Electrolyte
- Chest X Ray PA view
- ECG
- 2-D Echo.

The above investigations were done in all patients. Other laboratory and imaging investigations were done in selected patients, when needed. All patients were treated as per the 2013 ACCF/AHA Guidelines for the Management of Heart Failure [16]. All patients were put under continued follow-up during their entire hospital stay until study endpoint [discharge after clinical improvement (or) death]. The variables and the in-hospital outcome [discharge after clinical improvement (or) death] were recorded in a confidential database as per Helsinki Declarations which in turn were subjected to correlation and statistical analysis at the end of the study.

OBSERVATION & RESULTS

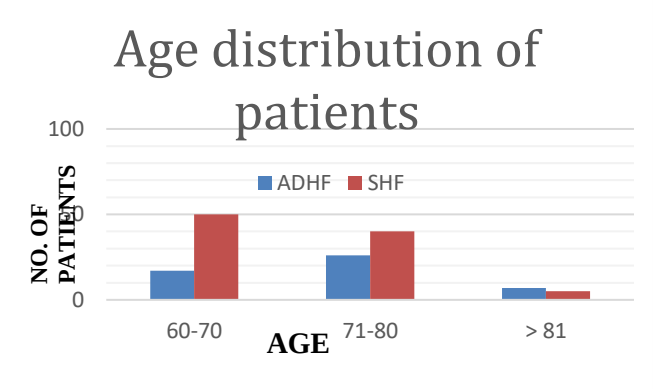
We have observed patients of heart failure and compare with various characteristics parameters. The finding of the study are as follows:-

SOCIO-DEMOGRAPHIC CHARACTRESTICS OF STUDY SUBJECTS

Table 1. Association of age group among HF patients.

Age group	ADHF	SHF	Chi square	*P-value*
60-70	**17**	**50**	**6.187**	**0.045339**
71-80	**26**	**40**		
>80	**7**	**5**		

Fig 1.1 Bar diagram showing Distribution by age

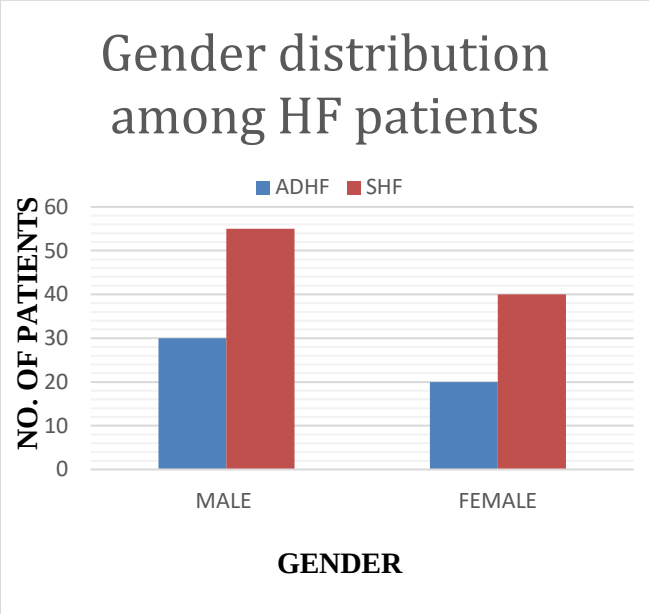


Age has emerged as a significant factor (p 0.045) for HF patients in our study. A maximum no. of patients falls in the age window of 71-80. Mean age was 71.77±0.72 years.

Table 2. Association of gender among HF patients.

Gender	ADHF	SHF	*Chi square*	*p* value
Male	**30**	**55**	**0.0599**	**0.80672**
Female	**20**	**40**		

Fig 2.1 Bar diagram showing gender distribution

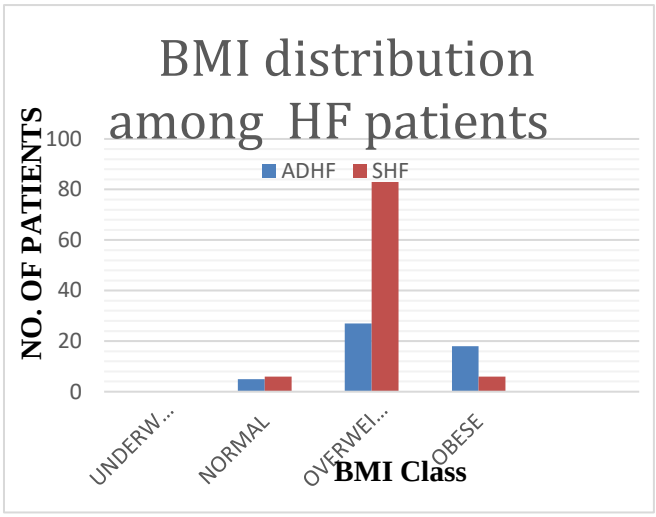


We have observed that the male patients were affected by HF than the female patients, but there is no significant relationship (p 0.806) between gender and HF patients.

Table 3: Association of BMI among HF patients

BMI	ADHF	SHF	*Chi square*	*p* value
UNDERWEIGHT	**0**	**0**	**22.834**	**0.00001**
NORMAL	**5**	**6**		
OVERWEIGHT	**27**	**83**		
OBESE	**18**	**6**		

Fig 3.1. Bar diagram showing BMI in HF patients

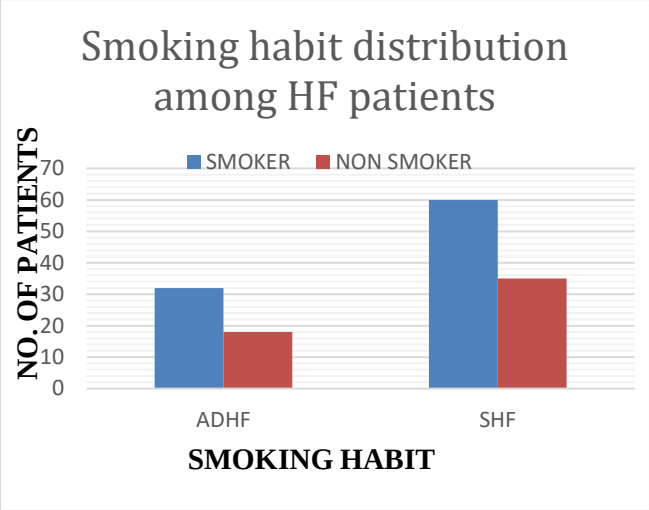


The observation showed that there is significant (*p* 0.0001) relationship between BMI & HF patients. Most HF patients were in Overweight class followed by obese group.

Table 4: Association of smoking habit among HF patients

SMOKING HABIT	ADHF	SHF	Chi square	*p* value
SMOKER	**32**	**60**	**0.01**	**0.92028**
NON-SMOKER	**18**	**35**		

Fig 4.1 Bar diagram showing smoking habits among HF patients

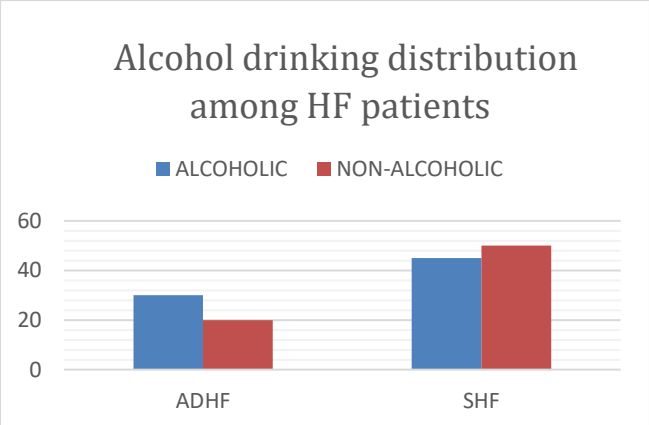


We have found that there is no significant (*p*0.920) relationship between Smoking ratio and HF patients.

Table 5: association of alcohol among HF patients

Alcohol drinking	ADHF	SHF	Chi square test	P value
Alcoholic	**30**	**45**	**2.093**	**0.148**
Non alcoholic	**20**	**50**		

Fig 5.1 Bar diagram showing alcohol drinking among HF patients

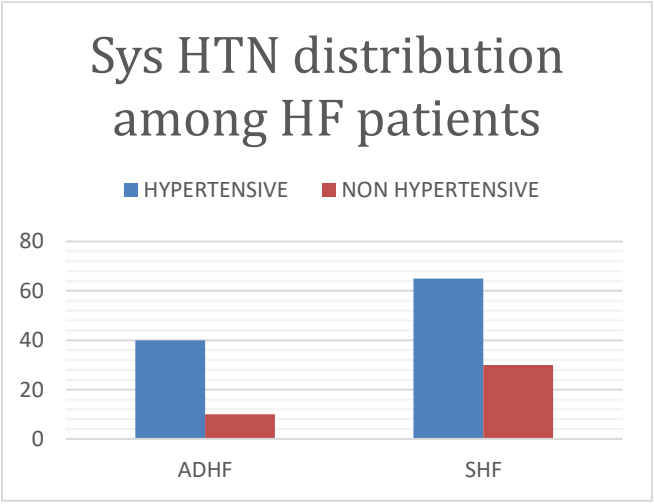


We have observed that there is no significant (*P 0.148*) relationship between alcoholic ratio and HF patients.

Table 6. Association of Systolic blood pressure among HF patients

Systolic HTN	ADHF	SHF	Chi square test	P value
HTN	**40**	**65**	**2.2**	**0.13813**
Non HTN	**10**	**30**		

Fig 6.1. Bar diagram showing distribution of Sys HTN among HF patients

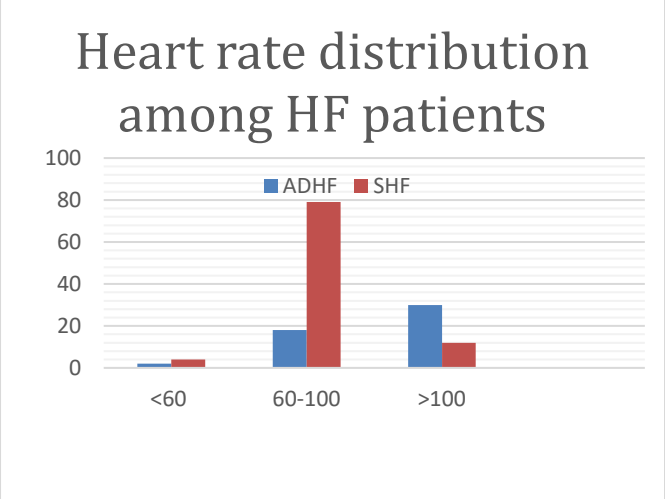


Following the statical analysis, we have observed that more hypertensive patients presented with symptoms of heart failure than normotensive patients, but there is no significant (*p*0.138) relationship between hypertensive ratio and HF patients

Table 7: Association of heart rate among HF patients

Heart Rate	ADHF	SHF	Chi square test	*p* value
<60	2	4	36.27	0.00001
60-100	18	79		
>100	30	12		

Fig 7.1 Bar diagram showing heart rate among HF patients

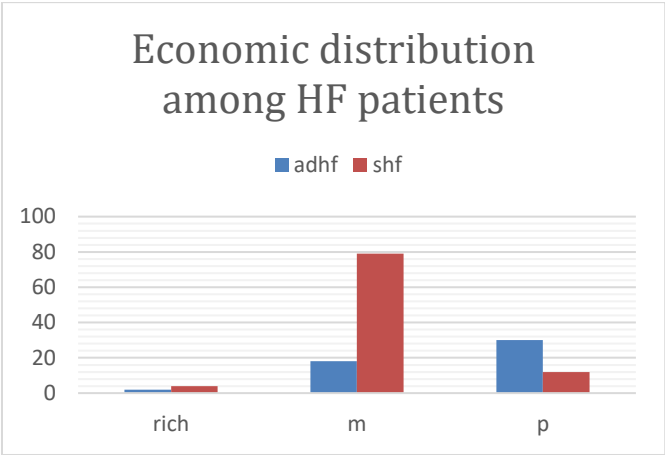


We have found that the admission heart rate is a very strong indicator of HF in our study (p 0.0001), in which more patients came with heart rate between 60-100bpm.

Table 8: Association of Economic status among HF patients.

Economic status	ADHF	SHF	Chi square	*p* value
Rich	2	4	36.27	0.00001
Middle class	18	79		
Poor	30	12		

Fig 8.1 BAR diagram showing economic status among HF patients

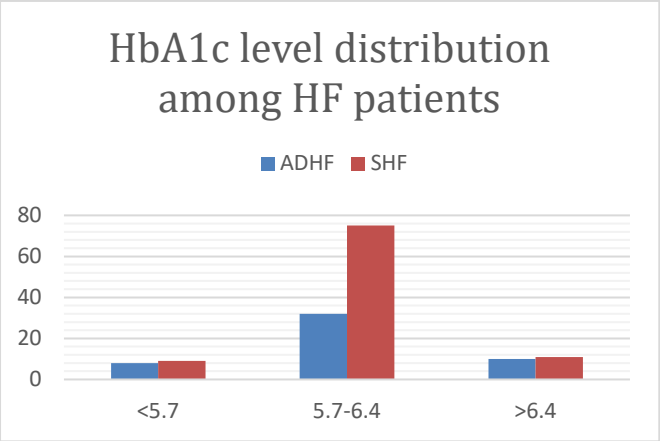


We observed that there is significant (*p* 0.00001) relationship between economic status and HF, HF was diagnosed in middle class patient mostly in our study.

Table 9: Association of HbA1c level among HF patients

HbA1C	ADHF	SHF	Chi square	*p* value
<5.7	8	9	3.79	0.15062
5.7-6.4	32	75		
>6.4	10	11		

Fig 9.1 Bar diagram showing HbA1c level among HF patients

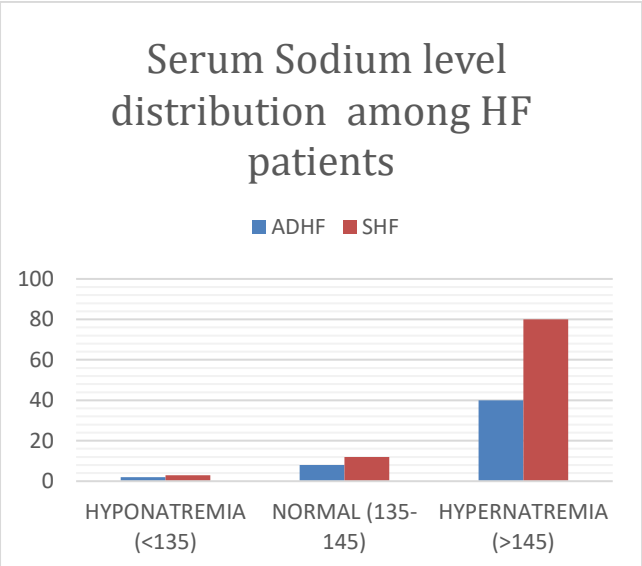


In our study, the diabetic status of study subjects doesn't associate (p 0.1506) with heart failure patients.

Table 10: Association of Serum Sodium level among HF patients

S.Sodium	ADHF	SHF	Chi square test	*p* value
<135	**2**	**3**	**0.41**	**0.81586**
135-145	**8**	**12**		
>145	**40**	**80**		

Fig 10.1: Bar diagram showing Serum Sodium level among HF patients

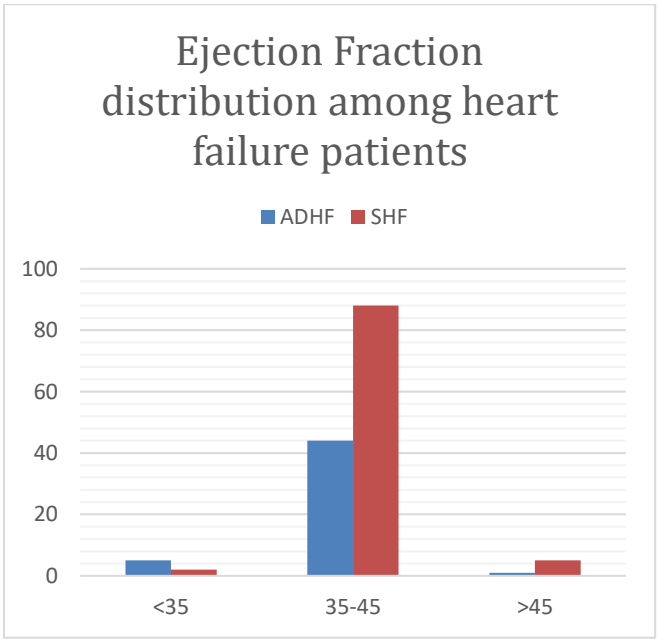


No Significant difference in serum sodium level was found (p = 0.815) in heart failure patients, in our study.

Table 11. Association between Ejection Fraction among HF patients

Ejection Fraction (%)	AD HF	SHF	Chi square	p-Value
<35	5	0	0.841	0.35922
35-45	43	90		
>45	1	5		

Fig 11.1 Bar diagram showing Ejection fraction among heart failure patients

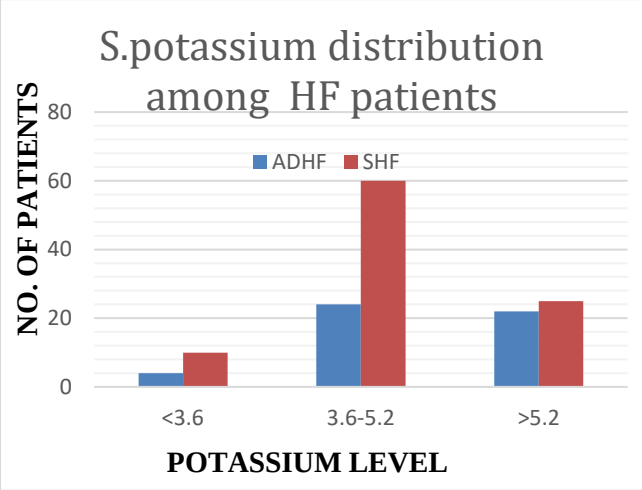


In the present study, there is no significant difference (p 0.359 was found between severity of systolic dysfunction (low ejection fraction) and HF.

Table 12 – Association of S. Potassium level among HF patients.

s.patassium	ADHF	SHF	Chi square test	P value
<3.6	4	10	4.68	0.096503
3.6 - 5.5	24	60		
> 5.5	22	25		

Fig 12.1 Bar diagram showing Serum Potassium level among heart failure patients.

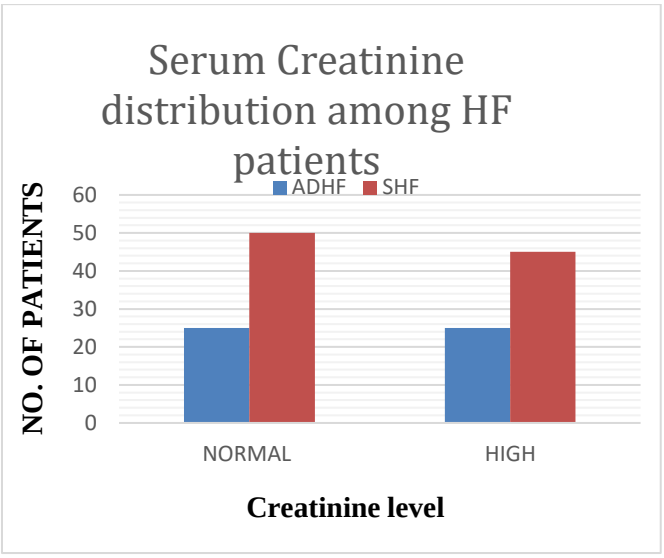


Our study showed no significant (p 0.096) relationship between S. Potassium level and HF patients.

Table 13 – Distribution of Serum Creatinine level among HF patients

S. CREATININE	ADHF	SHF	Chi square test	p-value
Normal	**56**	**30**	**6.31**	**0.01201**
High	**26**	**33**		

Fig 13.1 Bar diagram showing serum potassium level in heart failure patients



Our study have shown significant (p 0.012) relationship between Serum Creatinine and HF patients.

Discussion:

As we know that Heart Failure (HF) is a chronic complex clinical condition that results from any structural or functional impairment of ventricular filling or ejection of blood [1]. There is mounting evidence that Heart Failure (HF) has been recognized as a global public health burden costing the US $346.17 billion [3].

In our study, we observed in the result section, the factors that are associated with heart failure include: age, gender, smoking history, heart rate, ejection fraction, systemic hypertension, diabetes

mellitus (HbA1c), Creatinine, Sodium, Potassium, BMI, Alcohol consumption and Economic Status. Although our study observation suggested same, we found very less significant association between gender and HF patients. Fabijanic et al. reported that the overall in-hospital mortality rate increases with the age in case of both genders and our study signify that (p-value: 0.806) [17].

Although smoking is a common risk factor for CVD, history of smoking was found not to be significant for predicting HF in our study (p 0.920). A study of Song et al. supports our observation [18]. In our study, lower systolic blood pressure was unable to statistically distinguish between ADHF and SHF. The current analysis of our study clearly demonstrated a pattern of increased HF evidences with decreasing systolic blood pressure. Lower systolic blood pressure values, especially those beyond 160 mm Hg, have been found to be connected with an increased HF association. On the other hand, systolic blood pressure between 140-159 mmHg is linked to a higher HF association [19, 20].

Though heart rate is an indicator of HF, but heart rate of less than 100 appears to be associated with better prevention rate (66.9%).In our study, we found significant difference (p 0.0001) between heart rate and HF. The majority of HF patients do experience modest dyselectrolytemia as a result of neurohormonal alterations and numerous medicines. In these patients, mild hyponatremia is typical. [21, 22]. We found no significant difference (p 0.815) between level of serum sodium and incidence of HF.

In our patients, ejection fraction has very less prognostic indication. 91.03% of patients had ejection fraction of 35-45% where the ADHF rises to 30.34% of patients having 35-45% ejection fraction and our study denies the association of Ejection Fraction with HF (p 0.359) [23,24]. In our study economic status is mostly indicative to middle class population, which signifies economic status does associated with HF patients (p0.0001). Further study concludes that S. Creatinine level is also indicative to HF which is found in our study (p0.012). Followed by overweight and obese patients are more indicative towards CVD and in our study, we found mostly overweight patients and are indicative of bright significancy (p0.0001) of our study in HF patients.

Conclusion:

In the present study, age, BMI, Heart Rate, economic status and serum creatinine have shown significant difference when compared with the incidence of heart failure in the geriatric patients. There are some characteristics that can significantly affect the survival of admitted patients in the case of acute decompensated heart failure and morbidity condition which can decrease the patient's health related quality of life and there is need of more such studies, to investigate such characteristics further.

Acknowledgement:

Authors are grateful to the management of NIMS University for providing facilities for research work. We are also thankful to the technical staffs for their help.

References:

1. Mishra S, Mohan JC, Nair T, Chopra VK, Harikrishnan S, Guha S, Ramakrishnan S, Ray S, Sethi R, Samal UC, Chandra KS. Management protocols for chronic heart failure in India. Indian heart journal. 2018 Jan 1; 70(1):105-27.
2. Yancy C.W. ACCF/AHA guideline for the management of heart failure: a report of the american college of cardiology Foundation/American heart association task force on practice guidelines. *Circulation.* 2013; 2013(128): e240–232.
3. Krech R, Kickbusch I, Franz C, et al. Banking for health: the role of financial sector actors in investing in global health. BMJ Glob Health 2018; 3: e000597.
4. Institute for Health Metrics and Evaluation. Global Health Data Exchange. Available online: http://ghdx.healthdata. org/gbd-results-tool. Accessed August 7, 2019.
5. Lippi G, Sanchis-Gomar F. Global epidemiology, and future trends of heart failure. AME Med J. 2020 Jun 25;5(15):1-6.
6. Harikrishnan S., Sanjay G., Anees T. Clinical presentation, management, in-hospital and 90-day outcomes of heart failure patients in Trivandrum, Kerala, India: the Trivandrum Heart Failure Registry. *Eur J Heart Fail.* 2015;17(August (8)):794–800.

7. Guha S, Harikrishnan S, Ray S, Sethi R, Ramakrishnan S, Banerjee S, Bahl VK, Goswami KC, Banerjee AK, Shanmugasundaram S, Kerkar PG. CSI position statement on management of heart failure in India. Indian heart journal. 2018 Jul;70(Suppl 1): S1.

8. Huffman M.D., Prabhakaran D. Heart failure: epidemiology and prevention in India. *Natl Med J India.* 2010;23(October (5)):283–288.

9. Yancy C.W. ACCF/AHA guideline for the management of heart failure: a report of the American college of cardiology Foundation/American heart association task force on practice guidelines. Circulation. 2013; 2013(128):e240–232.

10. Gerber Y, Weston SA, Redfield MM, et al. A contemporary appraisal of the heart failure epidemic in Olmsted County, Minnesota, 2000 to 2010. JAMA Intern Med 2015; 175:996-1004.

11. Lippi G, Sanchis-Gomar F. Global epidemiology and future trends of heart failure. AME Med J 2020; 5:15.

12. Savarese G, Lund LH. Global public health burden of heart failure. Card. Fail Rev. 2017 Apr; 3(1): 7-11.

13. Xavier D, Pais P, Devereaux PJ, Xie C, Prabhakaran D, Reddy KS, et al. Treatment and outcomes of acute coronary syndromes in India (CREATE): A prospective analysis of registry data. Lancet. 2008; 371:1435–42.

14. Ruhil R. India has reached on the descending limb of tobacco epidemic. Indian J Community Med. 2018; 43:153–156.

15. The current situation. ICC-National Heart Failure Registry. Available from: https://iccnhfr.org/the-current-situation.

16. Writing Committee Members, Yancy CW, Jessup M, et al. 2013 ACCF/AHA guideline for the management of heart failure: a report of the American College of Cardiology Foundation/American Heart Association Task Force on practice guidelines. Circulation. 2013 Oct 15; 128(16):e240-327.

17. Fabijanic D, Culic V, Bozic I, Miric D, Stipic SS, Radic M, Vucinovic Z. Gender differences in in-

hospital mortality and mechanisms of death after the first acute myocardial infarction. Annals of Saudi medicine. 2006 Nov;26(6):455-60.

18. Song C, Fu R, Dou K, Yang J, Xu H, Gao X, Wang H, Liu S, Fan X, Yang Y. Association between smoking and in-hospital mortality in patients with acute myocardial infarction: results from a prospective, multicentre, observational study in China. BMJ open. 2019 Aug 1; 9(8):e030252.

19. Danziger J, Chen K, Cavender S, Lee J, Feng M, Mark RG, Mukamal KJ, Celi LA. Admission peripheral edema, central venous pressure, and survival in critically ill patients. Annals of the American Thoracic Society. 2016 May; 13(5):705-11.

20. Lahoz R, Fagan A, McSharry M, Proudfoot C, Corda S, Studer R. Recurrent heart failure hospitalizations are associated with increased cardiovascular mortality in patients with heart failure in Clinical Practice Research Datalink. ESC heart failure. 2020 Aug; 7(4):1688-99.

21. Nowbar AN, Gitto M, Howard JP, Francis DP, Al-Lamee R. Mortality from ischemic heart disease: Analysis of data from the World Health Organization and coronary artery disease risk factors From NCD Risk Factor Collaboration. Circulation: cardiovascular quality and outcomes. 2019 Jun;12(6):e005375.

22. Gheorghiade M, Abraham WT, Albert NM, et al: Systolic blood pressure at admission, clinical characteristics, and outcomes in patients hospitalized with acute heart failure. JAMA 2006; 296:2217.

23. Brophy JM, Deslauriers G, Rouleau JL. Long-term prognosis of patients presenting to the emergency room with decompensated congestive heart failure. Can J Cardiol 1994; 10:543

24. Lee DS, Austin PC, Rouleau JL, Liu PP, Naimark D, Tu JV. Predicting mortality among patients hospitalized for heart failure: derivation and validation of a clinical model. JAMA 2003; 290:2581–7

Cite this article Vats S *et al,* Clinico-epidemiological Profile of Geriatric Patients Presenting with Heart Failure: A Hospital Based Study. Indian Journal of Health Care, Medical & Pharmacy Practice.2023; 4(1) 37-49.