ORIGINAL ARTICLE

FACTORS PRECIPITATING CHRONIC HEART FAILURE. STUDY IN TERTIARY CARE HOSPITAL

Zahidullah Khan, Noor Mohammad, Zahid Fida, Wazir Mohammad, Inamullah Khan, Aliena Badshah

Department of Medicine, Khyber Teaching Hospital, Peshawar - Pakistan

Department of Nephrololgy, Lady Reading Hospital, MTI, Peshawar - Pakistan

ABSTRACT

Objectives: To identify the factors precipitating heart failure(HF) in patient admitted in a tertiary care hospital.

Material and Methods: This study cross sectional, retrospective, observational single center study was carried out in the department of medicine Khyber Teaching Hospital Peshawar - Pakistan from April 2017 to March 2018. The total sample size was 151, keeping 8% margin of error and 95% confidence interval. All the patients were either diagnosed as CCF in ward/OPD or previously diagnosed and came to ward with other complaints. All admitted patients or patients seen in OPD were included in study.

Results: A total of 151 already diagnosed congestive cardiac failure patients were enrolled in the study. Out of 151 patients, 86 were male and 65 were female. The age distribution amongst study group was 25 to 65 years. The mean age of the patients was 51.5±12.5SD years. Minimum age of the patients was 17 years and maximum age was 75 years. The major factors causing exacerbation of previously stable heart failure were poor drug compliance (34%), Infection (34%), uncontrolled hypertension (33%), uncontrolled diabetes mellitus (32%), new onset arrhythmia (29%), new onset ischemia (26%), anemia (23%), deranged renal function tests (13%),Hyperthyroidism (09%), fluid retaining drugs (06%) and hypothyroidism (03%.)

Conclusion: Poor drug compliance, infection and uncontrolled hypertension/diabetes mellitus are the commonest causes leading to heart failure. Proper patient education, unnecessary medications and timely follow up can reduce the rate of hospital admission and possible mortality.

Keywords: Congestive cardiac failure, atrial fibrillation, hypertension, poor compliance.

This article may be cited as: Khan Z, Mohammad N, Fida Z, Khan WM, Khan I, Badshah A. Factors precipitating chronic heart failure. Study in tertiary care hospital. J Med Sci 2019; 27: (3) 220-224.

INTRODUCTION

Heart failure (HF) is a major and rapidly growing public health problem, affecting nearly 37.7 million people worldwide[1]. Only in US, an estimated 5.7 million people were affected by heart failure in 2011and nearly 870,000 new cases are diagnosed every year. Heart failure is a primarily a disease of old people (>60 years) and its prevalence increases with age. In developed countries, generally 1-2 % of the adult population is suffering from heart failure[3, 4]. Global Burdon of Disease study reveals that almost 17.3 million people died of cardiovascular causes in 2013, which is 41% higher than deaths due to cardiovascular diseases in 1990[5].

The ACC Foundation and AHA define HF as "a complex clinical syndrome that results from any structural or functional impairment of ventricular filling or ejection of blood". According to their joint guidelines, HF with reduced ejection fraction (HFrEF) is defined as an ejection fraction ≤40%, whereas HF with preserved ejection fraction (HFpEF) is defined as an ejection fraction ≥50%. Patients with an ejection fraction that falls between this range are considered to have borderline HFpEF[6].

HF can be classified as left ventricular, right ventricular or biventricular, based on location of the deficit[7]. The symptoms depend largely on the side of the heart which is failing predominantly. Given that the left side of the heart pumps the blood from the lungs to the organs, failure to do so leads to the congestion of the lung veins and symptoms that reflect this, as

Dr. Noor Mohammad (Corresponding Author)
Assistant Professor
Department of Nephrololgy, Lady Reading Hospital, MTI, Peshawar - Pakistan
E-mail: drnoormiani@gmail.com
Contact: +92 - 300-593-1074
Date Received: 30th May, 2019
Date Revised: 26th July, 2019
Date Accepted: 10th September, 2019

well as a reduced supply of blood to the tissues. The predominant respiratory symptom is shortness of breath on exertion (or in severe cases even at rest) and easy fatigability[8].

The course of chronic heart failure is marked by frequent hospitalization and high mortality. Despite better understanding and improvement in the treatment and medical care of chronic heart failure, still it consumes a lot of medical resources of the hospital. In fact, HF is considered the number one cause of admission in both medical and surgical departments[9, 10]. HF is responsible for 3 to 7% of hospital admissions in several English speaking African countries[11]. A study conducted in 2008-2010 reported that heart failure was responsible for 22.87% of all case hospitalizations with an average hospital stay of 4.97 days[12]. Therefore it is important to assess and prevent the factors causing decompensation of chronic heart failure and thereby reducing burden on hospital resources. The precipitating factors leading to heart failure decompensation can be identified in most of the cases by taking proper detailed history[13-15]. Various precipitating factors have been blamed for aggravating heart failure in stable chronic heart failure patients. Some studies pointed non-compliance with the drug as the major cause; others indicated infection as the leading cause[16-18]. Some studies reported failure to compliance with the dietary restrictions[19, 20]. Poorly controlled hypertension, arrhythmias and aggravating ischemia has been labeled for worsening of heart failure[17, 21]. The main objective of the study was to find out the relative frequency of various factors which are responsible for precipitation of heart failure in previously stable chronic heart failure patients. This identification will also help us for short and long term improved risk stratification and management. This may also help in reducing hospital admission and stay.

MATERIAL AND METHODS

This cross sectional, observational single center study was conducted in Department of Medicine Khyber Teaching Hospital Peshawar from April 2017 to March 2018. The total sample size was 151, keeping 8% margin of error and 95% confidence interval, using WHO sample calculator. Non probability consecutive sampling technique was used to collect data. All diagnosed cases of heart failure from age 15 years to 75 years who were either seen in OPD or admitted in Medical Units, were included in the study. All those patients who were confused on arrival to OPD or at time of admission due to any cause were excluded from study. Those patients who refused to be part of study were also excluded. Data was collected from all diagnosed cases of heart failure after taking informed consent.

Proper history, thorough clinical examination and relevant investigations were performed of all patients. All investigations (pathological, cardiac, and radiological) were performed from hospital under supervision of competent consultants. All informations and demographic data like name, age, sex, address etc were recorded on pre designed proforma and analyzed using SPSS version 20. All the results were presented in form of tables or graphs. P value was considered as significant if it is less than 0.05 (<0.05).

RESULTS

Total 151 diagnosed patients with chronic heart fail were study in a tertiary care hospital Peshawar. Mean age of the patients was 51.5±12.5 SD. Mean age of male was 53.3±13.2 SD with minimum age 17 years and maximum age 75 years. Mean age of the female was 49.0±11.13 SD with minimum age 15 years and maximum age 70 years. The age statistics is shown in table 1. In our study, out of 151 participants, 86 (57%) were male and 65 (43%) were female in ratio of 1.3:1 as shown in Fig.1 Baseline screening of all patients were performed. Out of 151 patients, hypertension was present in 85 (56%) of studied population, deranged lipid profile in 59 (39%) patients and diabetes mellitus in 55 (36%) patients.

Fifty three (35%) patients were either active smoker or had past history of smoking. Hakimi treatment was used by 45 (30%) of patients. Baseline characteristics of the studied population are shown in table 2. Risk factors responsible for precipitating chronic heart failure were: poor compliance to drugs in 51 (34%) patients, infection in 51 (34%) patients, uncontrolled hypertension in 49 (33%) patients, uncontrolled diabetes mellitus 48 (32%) patients, new onset arrhythmia in 44 (29%)patients, new onset ischemia 39 (26%), anemia 34 (23%) and derange renal functions in 20 (11%) patients. The percentages are shown in table 3.

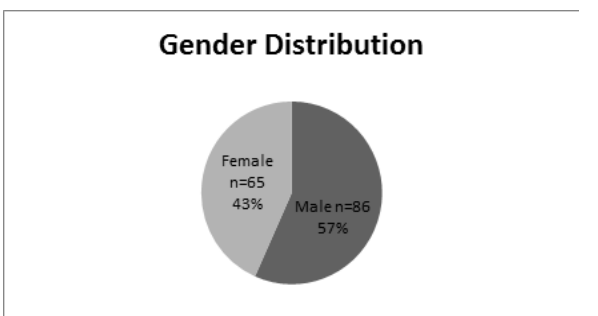

Fig 1: Gender distribution

Table 1: Age statistics in years.

Mean	**51.5**
Median	51.0
Mode	43.0
Std. Deviation	12.5
Minimum	15.0
Maximum	75.0

Table 2: Baseline screening of population (n=151).

Parameter		Frequency & % ages
Gender	Male	86 (57.0%)
	Female	65 (43.0%)
Diabetes Mellitus	No Diabetes	96 (64.0%)
	Diabetes	55 (36.0%)
Hypertension	No Hypertension	66 (44.0%)
	Hypertension	85 (56.0%)
Dyslipidemia	Yes	59 (39.0%)
	No	92 (61.0%)
Smoking	Yes	53 (35.0%)
	No	98 (65.0%)
Hakeem Medications	Yes	45 (30.0%)
	No	106 (70.0%)
Steroid Abuser	Yes	41 (27.0%)
	No	110 (73.0%)
Life style	Active	53 (35.0%)
	Sedentary	98 (65.0%)
Socioeconomic status	Lower Class	65 (43.0%)
	Middle Class	50 (33.0%)
	Upper Class	36 (24.0%)

Table 3: Risk factors precipitating heart failure (n=151)

	Frequency (n=151)	Percentage (%)	P Value
Poor compliance to drugs	51	34	0.04
Infection	51	34	0.30
Uncontrolled Hypertension	49	33	0.32
Uncontrolled Diabetes	48	32	0.33
New onset Arrhythmia	44	29	0.36
New onset Ischemia	39	26	0.01
Anemia	34	23	0.44
Deranged Renal functions	20	13	0.01
Hyperthyroidism	13	09	0.66
Fluid Retaining Drugs	09	06	0.72
Hypothyroidism	05	03	0.79

DISCUSSION

Heart failure is a rapidly increasing health problem worldwide and is likely to increase in the coming years. In developed countries, chronic heart failure consumes 1-2% of whole health care resources[22].

To reduce the burden of heart failure, we need to reduce its prevalence by reducing/controlling the risk factors like hypertension, diabetes mellitus, smoking, dyslipidemia and obesity. As chronic heart failure is characterized by episodes of exacerbation and remissions, it is also important to find out the risk factors which exacerbate the symptoms of already established heart failure and then every effort should be made to control those risk factors in order to prevent unnecessary hospital admission and burden on health care system.

In our study, the mean age of the patient was 51.5±12.5SD years. A local study conducted in Pakistan Institute of Medical Sciences show mean age of 51.13 years which correlates well with my study[23]. Another study conducted in a tertiary care hospital Peshawar showed mean age of 48.5 years which is less than our study. 24 Another study conducted abroad showed mean age 79 years which is higher than our study[14]. All these studies reveal that heart failure is the disease of middle to old age population.

Before concluding the results of precipitating factors of chronic heart failure exacerbation, we also studied the basic characteristics of the population. Hypertension (56%) was the commonest risk factor for heart failure. The other risk factors were dyslipidemia (39%), smoking (39%) and diabetes mellitus (36%). Due to lack of health awareness, low literacy rate, poverty and fast growing quackery due to poor functioning health regulatory authority, 30 % of the population was using hakimi medications. Twenty seven percent of population was chronic steroid abuser which was being used for generalized body aches and pains. Moreover, 65% of the patients were leading sedentary life either because of very busy routine schedule or unaware of the benefits of daily exercise. In our studied it was also concluded that most of the population was belonging to low socio-economic status (43%), 33% to middle class and only 24 % were well off. This may also points to the fact that only poor people visit government set up or it may be accidental finding. Nearly the same characteristics were also mentioned in another study conducted locally with exception of some marginal differences[23]. Vakil and colleagues conducted a study in 1949 in India which showed hypertension as the most common cause of heart failure (31%)[25].

In our study, poor compliance to the drugs and

infection were the commonest causes resulting in precipitation of heart failure (34%, $p<0.05$). Lack of financial resources, depression due to chronic debilitating illness or unfriendly environment, prescription of multiple/ low quality drugs and lack of health education/awareness were the main factors leading to poor compliance. Poor infection control due to poor sanitation/ self cleanliness, prescription of low quality drugs with sub optimal dosage, and quackery are the main culprits. Respiratory tract infections and urinary tract infection were the commonest infections. Poor compliance to drugs (30%) and infections (29%) were the leading causes of precipitation of heart failure in study conducted by Alejandro Diaz and colleagues[14]. Farooqi et al showed noncompliance in 43% of his population and it was the 3rd most common factor after uncontrolled hypertension and worsening myocardial ischemia while infection was present in 26% of patients[26]. Sidra Zahoor et al found noncompliance in 17.4% patients and was the 2ndcommonest cause while infection was the leading cause in 56% of population under study[23].

Uncontrolled hypertension, uncontrolled diabetes mellitus, new onset arrhythmia, new onset is chemia and anemia were other major causes of precipitation of heart failure. The most common arrhythmia that we encountered was atrial fibrillation. Uncontrolled hypertension was the commonest cause in local study conducted by Farooqi et al, followed by worsening of myocardial is chemia, noncompliance to drugs, anemia and infection[26]. An international study conducted by BariczEmoke showed infection as the most frequent cause followed by arrhythmia, poor compliance to drugs, uncontrolled hypertension, ischemia and anemia[27].

The other less frequent factors contributed were deranged renal function, hyperthyroidism, fluid retaining drugs (steroids and Ca channel blockers) and hypothyroidism. These factors also precipitated heart failure in patients mentioned in two local studies[23, 26].

CONCLUSION

Poor drug compliance, infections and poorly controlled hypertension and diabetes are the major precipitants of heart failure, leading to frequent hospital visits and admissions causing absenteeism from work and heavy blow to the health related budget. Health education, early recognition of infection and prescribing quality drugs in correct dose for hypertension, diabetes and its complications and regular follow up may reduce hospitalization.

REFERENCES

1. Bui AL, Horwich TB, Fonarow GC. Epidemiology and risk profile of heart failure. Nat. Rev. Cardiol. 2011; 8: 30–41.
2. Mozaffarian D, Benjamin EJ, Go AS, Arnett DK, Blaha MJ, Cushman M, et al. Heart disease and stroke statistics — 2016 update: a report from the American Heart Association. Circulation. 2016; 133: e38–e360.
3. Heidenreich PA, Albert NM, Allen LA, Bluemke DA, Butler J, Fonarow GC, et al. Forecasting the impact of heart failure in the United States: A policy statement from the American Heart Association. Circ. Heart Fail. 2013; 3: 606–619.
4. Cowie MR, Mosterd A, Wood DA, Deckers JW, Poole-Wilson PA, Sutton GC, et al. The epidemiology of heart failure. Eur. Heart J. 1997;18:208–225.
5. GBD 2013 Mortality and Causes of Death Collaborators. Global, regional, and national age-sex specific all-cause and cause-specific mortality for 240 causes of death, 1990–2013: a systematic analysis for the Global Burden of Disease Study 2013. Lancet. 2015; 385: 117–171.
6. Yancy CW, Jessup M, Bozkurt B, Butler J, Casey Jr DE, Colvin MM, 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;128:e240–e327
7. Ohtani T, Mohammed SF, Yamamoto K. Diastolic stiffness as assessed by diastolic wall strain is associated with adverse remodeling and poor outcomes in heart failure with preserved ejection fraction. Eur. Heart J. 2012; 33: 1742–1749.
8. Auble TE, Hsieh M, McCausland JB, Yealy DM. Comparison of four clinical prediction rules for estimating risk in heart failure. Ann Emerg Med 2007; 50: 127-135.
9. Adams KF, Jr, Fonarow GC, Emerman CL, LeJemtel TH, Costanzo MR, Abraham WT, et al. Characteristics and outcomes of patients hospitalized for heart failure in the United States: rationale, design, and preliminary observations from the first 100,000 cases in the Acute Decompensated Heart Failure National Registry (ADHERE). Am Heart J 2005; 149:209–216. [PubMed]
10. Jencks SF, Williams MV, Coleman EA. Rehospitalizations among patients in the Medicare fee-for-service program. N Engl J Med 2009; 360:1418–1428.
11. Mayosi BM. Contemporary trends in the epidemiology and management of cardiomyopathy and pericarditis in sub saharan African. Heart. 2007; 23: 1176–83.
12. Noor L, Adnan Y, Khan SB, Shah SS, Sarwar S, Qadoos A et al. In patient burden of heart failure in the Cardiology units of tertiary care hospitals in Peshawar. Pak J Physiol 2012; 8(1): 3-6.
13. Fonarow GC, Abraham WT, Albert NM, Stough WG, Gheorghiade M, O,Conner CM, et al. Factors identified as precipitating hospital admissions for heart failure and clinical outcomes: findings from OPTIMIZE-HF. Arch Intern Med 2008; 168:847–854.

14. Diaz A, Ciocchini C, Esperatti M, Becerra A, Mainardi S, Farah A, et al. Precipitating factors leading to decompensation of chronic heart failure in the elderly patient in South-American community hospital. J GeriatrCardiol 2011; 8:12–14.

15. Formiga F, Chivite D, Manito N, Casas S, Llopis F, Pujol R, et al. Hospitalization due to acute heart failure: role of the precipitating factors. Int J Cardiol 2007; 120:237–241

16. Leong KTG. Yan C. Goh PP. Precipitant in acute heart failure in a multiethnic Asian urban cohort study. J Heart Asia 2011; 3(1): 66–70.

17. Opasich C. Febo O. Riccardi PG. Traversi E. Forni G. Pinna G et al. Concomitant factors of decompensation in chronic heart failure.Am J Cardiol. 1996 Aug 1; 78(3):354-7.

18. Kapoor JR. Kapoor R. Ju C. Heidenreich PA. Eapen ZJ. Hernandez AF et al. Precipitating Clinical Factors, Heart Failure Characterization, and Outcomes in Patients Hospitalized With Heart Failure With Reduced, Borderline, and Preserved Ejection Fraction. J Am Coll Car. 2016;4(6):464-72

19. Psuyuki RT. McKelvie RS. Arnold JMO. Avezum A. Barretto ACP. Carvalho ACC et al. Acute Precipitants of Congestive Heart Failure Exacerbations. J Arch Intern Med. 2001;161:2337-2342.

20. Ghali JK. Kadakia S. Cooper R. Ferlinz J. Precipitating factors leading to decompensation of heart failure;Traits among urban blacks. Arch Intern Med. 1988;148(9):2013-6.

21. Matthias AT. Ekanayaka R. Precipitant profile of acute heart failure: experience of a tertiary level cardiac centre in Sri Lanka. JHeart Asia. 2013;5(1):86-91

22. Bundkirchen A. Epidemiology and economic burden of chronic heart failure. Euro Heart J Supplements. 2004;6:D57–D60.

23. Zahoor S, Arshad M. S, Riaz A, Farhan M. Precipitants of Acute Decompensated Heart Failure and their correlation with the Severity of Decompensation in a Resource Poor Country. JIMDC.2017;6(4):219-23

24. Khan H, Jan H, Hafizullah M. A Hospital-Based Study on Causes Peculiar to Heart Failure. J TehUniv Heart Ctr. 2009;4:25-8

25. Vakil RJ. A statistical study of 1281 cases of congestive cardiac failure or myocardial insufficiency in India. Indian Physician. 1949;8:281–9.

26. Farooqui AA, Tayyab H, Akram A, Zia H. Frequency of Different Factors Precipitating Cardiac Failure. P J M H S. 2017;11(3):1075-7

27. Emőke B, Szakács O, Toma L, Szabados C, Baricz J, Gyalai Z, et al. Clinical Presentation and Precipitating Factors for Acute Heart Failure Hospitalization. ActaMedicaMarisiensis. 2011;57(3):163-5

CONFLICT OF INTEREST: Authors declare no conflict of interest

GRANT SUPPORT AND FINANCIAL DISCLOSURE NIL

AUTHOR'S CONTRIBUTION

Following authors have made substantial contributions to the manuscript as under:

Khan Z: Literature review and data collection.

Mohammad N: Interpretation of data, computer work.

Fida Z: Data collection.

Khan WM: Overview of literature review and discussion.

Khan I: Collection of laboratory data.

Badshah A: Overall review of article, data collection.

Authors agree to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.