

# Frequency of Different Factors Precipitating Cardiac Failure

ARAFAT ALI FAROOQUI<sup>1</sup>, HALEEMA TAYYAB<sup>2</sup>, ABEERA AKRAM<sup>3</sup>, HARIS ZIA<sup>4</sup>

## ABSTRACT

**Background:** Cardiac failure is a clinical state which is an inability of heart to pump out the required amount of blood to the body which can be fatal if un-addressed.

**Aim:** To determine the frequency of different factors which may precipitate cardiac failure.

**Place & duration:** Mayo hospital, Lahore during 8 weeks.

**Design:** Cross-sectional study.

**Methods:** A total of 100 patients were recruited in the study. Selection was made on laid down criteria from adult population in Lahore, Pakistan after taking due consent. Interviews were conducted through a pretested questionnaire. Data was collected, compiled and analyzed through SPSS version 23.

**Results:** Uncontrolled blood pressure ( $p=0.007$ ) was the leading cause that precipitated heart failure. This was followed by worsening of myocardial ischemia ( $p=0.009$ ). Poor compliance was found to be the third leading cause ( $p=0.002$ ). Other statistically significant factors that played their role in aggravating the heart failure are high metabolic states (i.e., anemia) ( $p=0.01$ ), non-cardiac disorder ( $p=0.008$ ), infection ( $p=0.004$ ), excessive salt use ( $p=0.01$ ), fluid overload ( $p=0.001$ ) and arrhythmias ( $p=0.003$ ). Fluid retaining drugs were found to be statistically non-significant ( $p>0.05$ ).

**Conclusion:** Most of the precipitating factors can be avoided and controlled. If blood pressure is properly controlled and strict compliance to medications is ensured then majority of these events can be avoided. In addition to this, patient education regarding aggravating factors is mandatory.

**Keywords:** Cardiac failure, compliance, myocardial ischemia.

---

## INTRODUCTION

Cardiac failure is inability of heart to pump the required amount of blood; ultimately resulting in failure of tissues to take up the desired oxygen leading to the oxygen deprived state known as hypoxia which may lead to death of the patient if untreated or prolonged. Patients who have any known established cardiac disease are more prone to develop heart failure. Different factors may play their role in making the current cardiac state more severe. There are a few studies regarding different factors that may exacerbate the pre-existing heart disease that may result in heart failure.

Different studies have indicated the role of multiple factors in aggravating the heart failure. Some studies have shown that non-compliance with the recommended treatment has a major role in exacerbating the heart failure<sup>2,6,8</sup>. Some studies indicated infection as a leading cause<sup>2,7,8</sup>. Use of different drugs such as  $\beta$ -blockers, Calcium channel blockers (CCBs), NSAIDs, steroids, anti arrhythmics<sup>1</sup> or inappropriate reduction in CHF therapy<sup>1,6</sup> also contribute to the severity of the already existing disease. Failure to follow the dietary restrictions has a great impact in making the condition worse<sup>1,3,6</sup>.

---

<sup>1,3,4</sup>Department of Medicine; King Edward Medical University/Mayo Hospital Lahore. <sup>2</sup>Department of Medicine; Lahore General Hospital, Lahore.

Correspondence to Dr. Arafat Ali Farooqui  
Email: arafatalifarooqui@gmail.com

Worsening of ischemia<sup>4,5,7</sup> and uncontrolled hypertension<sup>4,5</sup> are one of the several factors that contribute to the worsening of heart failure. Arrhythmias are another cause of aggravating the heart failure<sup>7</sup>. Other factors that may play part are high output states such as anemia<sup>5</sup>, thyrotoxicosis<sup>6</sup>.

Since cardiac failure is a very dynamic subject and it is greatly affected by different factors so to study the frequency of different factors that may lead to exacerbation of heart failure presented to a tertiary care hospital in Pakistan is highly relevant and applicable to our community. It will help us suggest any further preventive measures which can be adopted to prevent the problem.

The objective of the study was to determine the frequency of different factors that may precipitate cardiac failure.

## MATERIALS & METHODS

A cross-sectional study was done in Mayo hospital Lahore to determine the frequency of different factors that may lead to aggravation of heart failure. Individuals suffering from cardiac failure (clinical signs & symptoms of cardiac failure) were included in the study, whereas uncooperative/uninterested individuals were excluded. Using SPSS version 11; one sample proportion with 95% CI, 80% power of the test, 5% margin of error, 27% prevalence<sup>1</sup> of excessive salt

intake, with an estimated 08 weeks population size of 120; calculated sample size is 100.

**RESULTS**

Out of 100 patients (n=100), 59 (59%) were males and 41(41%) were females. 43(43%) of patients were non-compliant (p=0.002) to their medications. 59(59%) of patients reduced their recommended therapy on their own. Infection (p=0.004) preceded the current episode of cardiac failure in 26(26%) of patients. Worsening of myocardial ischemia (p=0.009) led to the current condition in 44(44%) while arrhythmia (p=0.003) was a precipitating factor in 15(15%) of patients. Coming to drugs, 39(39%) were using β-blockers, 07(07%) were using calcium channel blockers (CCBs), 30(30%) were using fluid retaining drugs (p>0.05) [NSAIDs 23(23%), steroids 7(7%)] and 09(09%) were using other anti-arrhythmics. Regarding high metabolic states; 30(30%) were anemic (p=0.01). Regarding dietary habits, 19(19%) were using salt in excessive

amounts (p=0.01). 45(45%) had uncontrolled blood pressure (p=0.007). Fluid overload (p=0.001) triggered the current episode in 14(14%) of patients while 30(30%) had non-cardiac disorder as a precipitating cause (p=0.008). NYHA grading\* and primary cause of cardiac failure in patients is tabulated below:

\*NYHA: New York Heart Association

Table 1: Frequency Table

Precipitating Factor	N=100 (%)
Non-compliance	43(43%)
Infection	26(26%)
Worsening of myocardial ischemia	44(44%)
Arrhythmia	15(15%)
High metabolic state(anemia)	31(31%)
Excessive salt use	19(19%)
Uncontrolled BP	45(45%)
Fluid overload	14(14%)
Fluid retaining drugs	30(30%)
Non cardiac disorder	30(30%)

Table 2: Association of different factors precipitating cardiac failure

		Yes	No	Total	P-value
<b>Anemia</b>					
Gender	Male	18 (30.5%)	41 (69.5%)	59 (100%)	0.01*
	Female	12 (29.3%)	29 (70.7%)	41 (100%)	
<b>Excess salt use</b>					
Gender	Male	11 (18.6%)	48 (81.4%)	59 (100%)	0.01*
	Female	8 (19.5%)	33 (80.5%)	41 (100%)	
<b>BP Control</b>					
Diagnosis Time	<12 Months	31(55.4%)	25 (44.6%)	56 (100%)	0.007**
	>12 Months	24 (54.5%)	20 (45.5%)	44 (100%)	
<b>Noncardiac disorder</b>					
Diagnosis Time	<12 Months	17 (30.4%)	39 (69.6%)	56 (100%)	0.008**
	>12 Months	13 (29.5%)	31 (70.5%)	44 (100%)	
<b>Compliance</b>					
Anemia	Yes	17 (56.7%)	13 (43.3%)	30 (100%)	0.002**
	No	40 (57.1%)	30 (42.9%)	70 (100%)	
<b>Arrhythmia</b>					
Use of CCBs	Yes	1 (14.3%)	6 (85.7%)	7 (100%)	0.003^***
	No	14 (15.1%)	79 (84.9%)	93 (100%)	
<b>Fluid retaining drugs</b>					
Use of CCBs	Yes	2 (28.6%)	5 (71.4%)	7 (93%)	>0.05
	No	21 (22.6%)	72 (77.4%)	93 (100%)	
<b>Fluid overload</b>					
Use of steroids	Yes	1 (14.3%)	6 (85.7%)	7 (100%)	0.001^***
	No	13 (14.0%)	80 (86.0%)	93 (100%)	
<b>Worsening of MI</b>					
Hakeem meds	Yes	6 (42.9%)	8 (51.7%)	14 (100%)	0.009**
	No	38 (44.2%)	48 (55.8%)	86 (100%)	
<b>Infection</b>					
Arrhythmias	Yes	4 (26.7%)	11 (73.3%)	15 (100%)	0.004^***
	No	22 (25.9%)	63 (74.1%)	85 (100%)	

\*significant at 5%    \*\*significant at 1%    ^cells proportion >20%

Table 3:

NYHA GRADING	N=100(%)
NYHA GRADE 1	03(03%)
NYHA GRADE 2	42(42%)
NYHA GRADE 3	47(47%)
NYHA GRADE 4	08(08%)

Table 4: (n=100)

Primary cause of heart failure	n
Myocardial ischaemia	38(38%)
Diabetes mellitus	15(15%)
Valvular disorders	09(09%)
Hypertension	12(12%)
Inflammatory(myo/pericarditis)	02(02%)
Cardiomyopathy	06(06%)
Other causes	18(18%)

## DISCUSSION

Uncontrolled blood pressure' was the most common factor that precipitated cardiac failure. This is in accordance with the works of Chin MH et al<sup>4</sup> and Kapoor JR et al<sup>8</sup>. Worsening of myocardial ischemia came out to be the second most common factor that aggravated the cardiac failure which complies with the works of Fonarow GC et al<sup>3</sup>& Matthias AT et al<sup>5</sup>. Non-adherence or poor compliance to the medications was found to be the third most common factor precipitating heart failure which is in accordance with the works of Leong KTG et al<sup>2</sup>& Ghali JK et al<sup>6</sup>. High metabolic states such as anemia can exacerbate the heart failure which is in accordance with the work of Matthias AT et al<sup>5</sup>. Other factors which can aggravate the cardiac failure include inadequate dietary salt restrictions, infections, arrhythmias and fluid overload which comply with the works of Psuyuki RT et al<sup>1</sup>, Opasich C et al<sup>7</sup>, Fonarow GC et al<sup>3</sup> and Kapoor JR et al<sup>8</sup> respectively. However, the use of fluid retaining drugs (i.e., NSAIDs, steroids) was not associated with the worsening of heart failure which is in accordance with the work of Psuyuki RT et al<sup>1</sup>.

## CONCLUSION

Majority of precipitating factors are avoidable and controllable. Among these, uncontrolled blood pressure was found out to be the most common factor precipitating cardiac failure. This was followed

by the worsening of myocardial ischemia. The third most common precipitating factor came out to be the poor compliance of patients to their recommended therapy. If BP is properly controlled and strict compliance is ensured then majority of these events can be avoided. Other statistically significant factors that played their role in aggravating the heart failure are high metabolic states (i.e., anemia), non-cardiac disorder, infection, excessive salt use, fluid overload and arrhythmias. Fluid retaining drugs were found to be statistically non-significant.

**Acknowledgements:** Waqas Ahmed Farooqui from Department of Research; Dow University of Health Sciences Karachi helped in analysis of data.

## REFERENCES

1. Psuyuki RT, McKelvie RS, Arnold JMO, Avezum A, Barretto ACP, Carvalho ACC et al. Acute Precipitants of Congestive Heart Failure Exacerbations. *Journal of Archives of Internal Medicine*. 2001; 161:2337-2342.
2. Leong KTG, Yan C, Goh PP. Precipitant in acute heart failure in a multiethnic Asian urban cohort study. *Journal of Heart Asia* 2011; 3(1): 66–70.
3. Fonarow GC, Abraham WT, Albert NM, Stough WG, Gheorghiadu M, Greenberg BH et al. Factors Identified as Precipitating Hospital Admissions for Heart Failure and Clinical Outcomes. *Arch Intern Med*. 2008;168(8):847-854
4. Chin MH, Goldman L. Factors contributing to the hospitalization of patients with congestive heart failure. *Am J Public Health*. 1997 Apr;87(4):643-8
5. Matthias AT, Ekanayaka R. Precipitant profile of acute heart failure: experience of a tertiary level cardiac centre in Sri Lanka. *Journal of Heart Asia*. 2013 Jun 5;5(1):86-91
6. Ghali JK, Kadakia S, Cooper R, Ferlinz J. Precipitating factors leading to decompensation of heart failure; Traits among urban blacks. *Arch Intern Med*. 1988 Sep; 148(9):2013-6.
7. 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.
8. 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. *Journal of American College of Cardiology*. 2016 Jun; 4(6):464-72