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FACTORS ASSOCIATED WITH ADMISSION OF HEART FAILURE PATIENTS

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Contribution

JAS and MTF conceived the idea and designed the study. Data collection was done by SFM and MK while JAS did final review. All authors contributed equally to the submitted manuscript.

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ABSTRACT

Objective: To assess and identify various factors which are responsible for hospital admission of patients with heart failure at coronary care unit of a cardiac center in rural areas of Sindh, Pakistan.

Methodology: This cross-sectional study included consecutive patients admitted to the coronary care unit (CCU) of Chandka Medical College Hospital Larkana from January to June 2016. All the patients were known cases of cardiac failure, due to any etiology, and on anti-failure treatment and their disease was stable on medications. Patients presented with new onset of heart failure were excluded. After consent demographic information, risk factors, and information regarding precipitating factors were obtained.

Results: A total of 104 patients were included in this study, male to female ratio was 2:1, mean age was 57.82 (± 11.65) years. Hypertension was presented in 57 (54.8%) patients, 34 (32.7%) patients were diabetics, and smokers were 49 (47.1%) patients. The majority, 66 (63.5%), were presented with shortness of breath, 25 (24.0%) with orthopnea, nine (8.7%) with frank pulmonary oedema, and remaining four (3.8%) with paroxysmal nocturnal dyspnea. Precipitating factors causing rehospitalization were noncompliance of treatment 57 (54.8%), chest infections 18 (17.3%), cardiac arhythmia 11 (10.6%), myocardial ischemia seven (6.7%), and remaining 11 (10.6%) had other miscellaneous factors. One patient died during the hospital course.

Conclusion: Rehospitalization of patients with heart failure in the majority of patients was due to noncompliance to treatment, other causes include respiratory tract infections and myocardial ischemia.

Key Words: Diabetes, Heart failure, Coronary care unit, Re-Hospitalization

INTRODUCTION

Heart failure (HF) is a global endemic imposes a direct or indirect burden on society and health care system through mortality, morbidity, loss of productivity, and increasing health care cost.[1] The global economic burden of HF was estimated to be $108 billion per annum with approximately 40% of it accounted for indirect cost and proportion of the indirect cost is higher for low and middle-income countries.[1] South Asia (SA) is the most densely populated region of the world inhabiting around one-fifth of the global population. South Asian countries are going through an epidemiological transition and experiencing the increasing burden of both non-communicable and infectious diseases.[2] Due to this transition, a shift has been observed in causes of mortality and morbidity, from nutritional deficiencies or infectious diseases to the causes due to lifestyle.[3] And with population aging and epidemiological transition, HF appears to become the leading concern in South Asian population in upcoming years.[4,5]

Despite increasing efforts and attention, rehospitalization following heart failure continues to increase and rate of rehospitalization within 60 to 90 days of heart failure is as high as 30% which rise to 50% at six months.[6,7] It is imperative to understand and identify the precipitating factors and root causes for the prediction and prevention of readmission, however, a little is known and much is unexplained.[8,9] A number of precipitants have been identified in past studies that may acutely exacerbate heart failure, which includes, patients related factors such as; non-adherence to the prescribed medication, alcohol and drug abuse, and dietary indiscretion, cardiac factors such as; uncontrolled hypertension, myocardial ischemia, and atrial fibrillation, and non-cardiac factors such as; chest infections, pneumonia, worsening renal function, and exacerbation of chronic obstructive pulmonary disease (COPD).[6,10]

Various strategies have been proposed to reduce readmission rate in HF patients, one such effective strategy is counseling of patient at the time of discharge about medication adherence, symptom monitoring, and lifestyle changes.[11,12] A study reported a lower risk of readmission among heart failure patients who were given a combination of drugs such as beta blockers, angiotensin-converting enzyme inhibitors, aldosterone antagonists, and angiotensin receptor blockers.[12-14]

There is paucity of studies on factors inducing hospital admission of heart failure patients in South Asian population, especially for the Pakistani population, therefore, aim of this study was to assess and identify various factors which are responsible for hospital admission of patients with heart failure at coronary care unit of a cardiac center in rural areas of Sindh, Pakistan.

METHODOLOGY

After approval of ethical review committee of the institution, consecutive patients admitted to coronary care unit (CCU) of Chandka Medical College Larkana, during the study duration of January 2015, to June 2015, fulfilling the inclusion criteria were recruited for this cross-sectional study. Inclusion criteria of the study were patients of either gender, above 18 years of age, diagnosed cases of cardiac failure due to any etiology, on anti-failure treatment, and were stable on medication for at least two weeks before rehospitalization. Patients presented with new onset of heart failure were excluded from this study. Consent regarding participation and confidentiality was obtained from all the patients or their legal caretakers. After consent information on demographic variables, presenting concerns, risk factors, precipitating factors, and in-hospital outcomes were obtained and collected using a predefined structural proforma. All the enrolled patients underwent a thorough physical examination and presenting concerns were recorded as shortness of breath (SOB), orthopnea, frank pulmonary oedema, and paroxysmal nocturnal dyspnea. Baseline risk profile of patients was obtained in terms of diabetes mellitus, hypertension, history or current smoking, and family history of premature coronary artery disease. Precipitating factors consist of noncompliance of treatment, chest infections, cardiac rhythm, myocardial ischemia, and other miscellaneous factors such as thyrotoxicosis, dietary indiscretion, drug abuse, exacerbation of chronic obstructive pulmonary disease (COPD), and etc. Echocardiography was performed in all the recruited patients and left ventricular systolic dysfunction (LVSD) was assess as normal, mild, moderate, and severe.

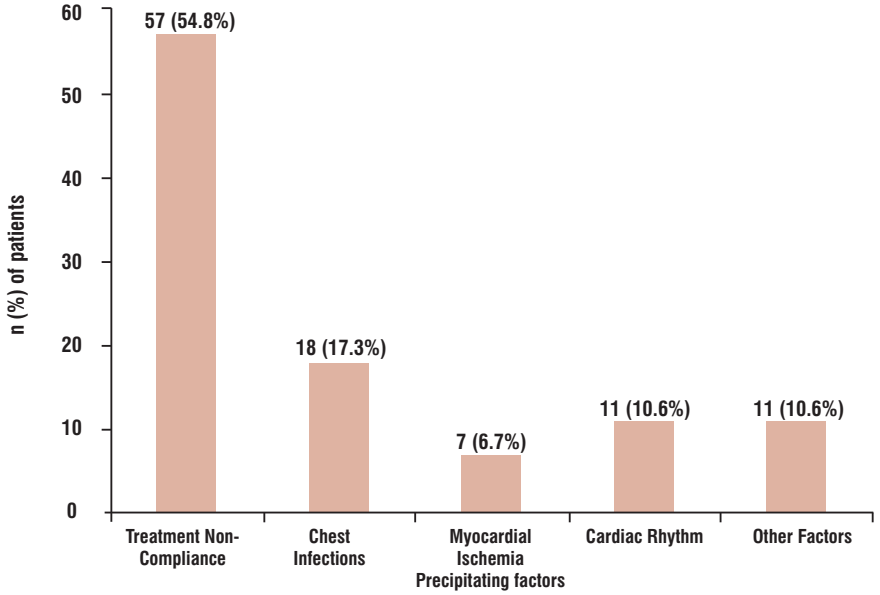
The sample size for the study was calculated at 95% confidence level and 10% margin of error and 40% expected the frequency of noncompliance of treatment among the previously diagnosed heart failure patients admitting to CCU. Under these assumptions, the calculated sample size was 93 previously diagnosed heart failure patients admitting to CCU. Collected data were entered and analyzed using IBM SPSS Statistics for Windows, Version 21.0. (IBM Corp., Armonk, NY, US). Frequency and percentage and mean ± standard deviation (SD) were calculated appropriately. Precipitating factors and in-hospital outcomes by demographic and baseline clinical characteristics of the patients were assessed by applying the chi-square test and criteria for statistical significance was $p-\leq 0.05$.

RESULTS

A total of 104 patients were included in this study, male to female ratio was 2:1 with 68.3% (71) were male, mean age was 57.82 (± 11.65) years with the rage of 30 to 100 years and majority of the patients, 69.2% (72), were between 30 to 60 years of age. Hypertension was presented in 57 (54.8%) patients, 34 (32.7%) patients were diabetics, 49 (47.1%) patient were smokers, and family history of coronary artery diseases (CAD) was observed in 13 (12.5%) patients. The majority, 66 (63.5%), were presented with shortness of breath, 25 (24.0%) with orthopnea, nine (8.7%) with frank pulmonary oedema, and remaining four (3.8%) with paroxysmal nocturnal dyspnea. At the time of presentation mean systolic blood pressure was 115.10 (± 22.85) mmHg, left ventricular systolic dysfunction was normal, mild, moderate, and severe in one (1.0%), nine (8.7%), 27 (26.0%), and 67 (64.4%) patients respectively. Only 14 (13.5%) patients were vaccinated for flu. One patient died during the hospital course.

Precipitating factors causing rehospitalization were noncompliance of treatment 57 (54.8%), chest infections 18 (17.3%), cardiac arrhythmia 11 (10.6%), myocardial ischemia seven (6.7%), and remaining 11 (10.6%) had other miscellaneous factors. Precipitating factors causing rehospitalization are presented in Figure 1.

Figure 1: Precipitating Factors Causing Re-Hospitalization of Heart Failure Patients



The precipitating factor of rehospitalization to CCU by the demographic and medical history of the heart failure patients are presented by in Table 1. Noncompliance to the treatment was found in a significantly higher number of male patients as compared to female patients. ($p < 0.05$)

Table 1: Precipitating Factor of Re-Hospitalization to CCU by Demographic and Medical History of the Heart Failure Patients

	n	Treatment Non-Compliance n (%)	Chest Infections n (%)	Myocardial Ischemia n (%)	Cardiac Rhythm n (%)	Other Factors n (%)
Gender						
Male	71	45 (63.4%)	9 (12.7%)	4 (5.6%)	5 (7.0%)	8 (11.3%)
Female	33	12 (36.4%)	9 (27.3%)	3 (9.1%)	6 (18.2%)	3 (9.1%)
**P-value		0.009*	0.067	0.512	0.085	0.736
Age						
? 60 years	72	41 (56.9%)	11 (15.3%)	5 (6.9%)	7 (9.7%)	8 (11.1%)
> 60 years	32	16 (50.0%)	7 (21.9%)	2 (6.2%)	4 (12.5%)	3 (9.4%)
**P-value		0.511	0.411	0.896	0.670	0.790
Hypertension						
Yes	57	33 (57.9%)	9 (15.8%)	5 (8.8%)	4 (7.0%)	6 (10.5%)
No	47	24 (51.1%)	9 (19.2%)	2 (4.3%)	7 (14.9%)	5 (10.6%)
**P-value		0.486	0.652	0.360	0.193	0.985
Diabetes Mellitus						
Yes	34	20 (58.8%)	4 (11.8%)	3 (8.8%)	6 (17.6%)	1 (2.9%)
No	70	37 (52.9%)	14 (20.0%)	4 (5.7%)	5 (7.1%)	10 (14.3%)
**P-value		0.566	0.297	0.552	0.102	0.077
History of CAD in family						
Yes	13	7 (53.6%)	3 (23.1%)	0 (0.0%)	2 (15.4%)	1 (7.7%)
No	91	50 (55.0%)	15 (16.5%)	7 (7.7%)	9 (9.9%)	10 (11.0%)
**P-value		0.940	0.556	0.300	0.546	0.717

*Statistically significant at 5% level of significance, **p-values are based on chi-square test, CAD = Coronary Artery Diseases, CCU = Coronary Care Unit

DISCUSSION

Despite major advancements and innovations in heart failure management strategies, high rates of rehospitalization for HF persist.[6] Evaluation, detection, and proper treatment of precipitating factors are recommended for the patients re-hospitalized for heart failure. Our study aims were to identify the frequent cause of rehospitalization to CCU among heart failure patients. For more than half, 54.8% (57), of the patients precipitating factor of readmission was non-compliance to the heart failure treatment. Poor adherence to the pharmacological and non-pharmacological recommendations is a pertinent problem among heart failure patients in our population. A study conducted by Farooquiet al., at Mayo hospital Lahore, reported non-adherence to the medications as a precipitating factor in 43 (43.0%) patients out of 100 heart failure patients.[15] Mujtaba et al. found around two-thirds, 72.7%, of the heart failure patients in our population are noncompliant to the prescribed medications.[16] According to this study, there are a number of factors lead to non-adherence in our population, inadequate prescription, lack of social support, and financial insufficiency are the leading factors. Non-compliance to the medications causing exacerbation and readmission of heart failure patients is not limited to our population. It has been reported by the studies from various parts of the world with varying degrees.[6,8,10,17,18] Ruppar et al. conducted a systematic review of the studies testing the effect of an intervention to improve medication compliance among heart failure patient.[18] The study concluded that the medications compliance improvement interventions among heart failure patient decrease mortality and rehospitalization rate.[18] Adherence to the medical regimen is a cornerstone of the heart failure management, non-adherence in our population is alarming, the ratio of non-complaint male patients were significantly higher than female, 63.4% vs. 36.4%; p=0.009. Patient counseling about the importance of medical therapy at the time of discharge can result in improved post-discharge outcomes and decreased rehospitalization rate.[10]

In our study chest infections was the second leading observed precipitating factor of rehospitalization of heart failure patients, account for 17.3% of the patients. Fonarowet al. in their findings from OPTIMIZE-HF reported for 15.3% of the patients, pneumonia/respiratory process was an exacerbating factor contributing to hospitalization.[10] Other cardiac causes observed in our study are the cardiac rhythm in 10.6% of the patients and myocardial ischemia in 6.7% of the patients. Fonarowet al. reported ischemia and arrhythmia as a precipitating factor of rehospitalization in 14.7% and 13.5% of the patients.[10] Another study conducted by Aroraet al. etiologies of 30 days rehospitalization for heart failure patients was cardiac for the majority, 49.8%, of the patients, pulmonary for 13.1% and renal for 8.9% of the rehospitalization[19].

LIMITATIONS

This study was conducted at a rural cardiac center, therefore, the generalizability of study findings are is limited. Further studies with larger sample size are warranted.

CONCLUSION

Rehospitalization of patients with heart failure in the majority of patients was due to noncompliance to treatment, other causes include respiratory tract infections and myocardial ischemia.

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