Original Article

Heart Failure Readmissions: A Deep Dive into Patient Demographics, Comorbidities, and Systemic Challenges

Fahad Raja Khan[1], Jabar Ali[1*], Wasim Sajjad[1], Anwar Jamal[1], Adil Bilal[1], Sami Ur Rehman[1]

[1]Lady Reading Hospital-Peshawar

Corresponding Author: Jabar Ali; Assistant Professor; Email: dr.jabarali78@gmail.com

Conflict of Interest: None.

ABSTRACT

Background: Heart failure (HF) is a leading cause of hospital readmissions, presenting significant challenges in healthcare. Comorbid conditions like diabetes and hypertension are prevalent among HF patients and may complicate disease management. Understanding these dynamics is crucial for developing effective intervention strategies.

Objective: This study aims to analyze the factors contributing to HF readmissions, focusing on patient demographics, comorbidities, and systemic healthcare challenges.

Methods: A comprehensive, retrospective cohort analysis was conducted at a tertiary care cardiac center. The study included 1,000 patients with a documented history of HF and instances of hospital readmissions. Patient selection was based on age (≥18 years), a diagnosis of HF, and readmission within six months post-discharge. Exclusion criteria included planned readmissions for elective procedures and cognitive impairments impeding consent. Data collection encompassed patient demographics, clinical history, comorbidity details, initial hospitalization, and readmission information. Descriptive statistics were employed to analyze and summarize the data.

Results: The cohort comprised 80% male (n=800) and 20% female (n=200) with a mean age of 58 years. The median hospital stay was 6 days. Comorbidities included diabetes (78%, n=780) and hypertension (56%, n=560). The primary cause of HF was ischemic cardiomyopathy (82%, n=820). The leading reasons for readmission were lack of counseling (42%, n=420), underdosage of medication (16%, n=160), and non-compliance to medication (13%, n=130). Other factors included volume overload (11%, n=110), secondary hypertensive failure (9%, n=90), infections (6%, n=60), anemia (2%, n=20), and progressive renal failure (1%, n=10).

Conclusion: The study highlights the complexity of managing HF, emphasizing the need for comprehensive approaches addressing patient education, medication management, and comorbidity control. Improved patient counseling and adherence to treatment regimens could significantly reduce HF readmissions.

Keywords: Heart Failure, Readmissions, Comorbidities, Ischemic Cardiomyopathy, Patient Education, Medication Adherence.

INTRODUCTION

Heart failure (HF), a leading challenge in cardiovascular medicine, is characterized by its increasing prevalence and significant hospital readmission rates (1). Roger et al. (2021) underscore the gravity of this issue, noting that these readmissions are not merely indicators of the disease's severity but also major contributors to escalating healthcare costs and demands on healthcare resources (2). Such insights establish HF as a central concern in cardiac-related hospitalizations, highlighting the urgency for developing effective management strategies (3-5)

The landscape of HF research, as delineated by studies from Wideqvist et al. (2021) and Awan (2019), points to a variety of factors influencing HF readmissions (6, 7). These encompass patient-related issues, such as non-compliance with medication regimes and inadequate lifestyle modifications, as well as systemic challenges like poor discharge planning and insufficient follow-up care (8, 9). However, Su et. al., (2019) have identified a significant gap in the current understanding, particularly in terms of how these factors interplay in diverse healthcare settings. This gap, they argue, is critical to achieving a holistic understanding and management of HF (10-12).

In response to this identified need, the current study was designed to conduct a thorough analysis at a renowned tertiary care cardiac center, recognized for its diverse patient population. This retrospective cohort analysis involved 1,000 patients with a history of HF, intending to unravel key factors contributing to readmission. This investigation particularly focused on patient demographics, comorbidities, and the primary etiology of HF (13, 14). Echoing the insights of Patel and Gupta (2022), such a focus is instrumental in generating insights that have the potential to influence both clinical practice and healthcare policy, thereby offering a more intricate view of the challenges faced in HF management (15).

The findings of this study are poised to add significantly to the existing body of knowledge in the field of heart failure. By meticulously analyzing the various determinants of HF readmissions, the research presents new pathways for enhancing patient outcomes and alleviating the burden on healthcare systems (16, 17). The implications of these findings are far-reaching, providing not only a richer academic understanding of heart failure but also practical guidance for healthcare practitioners and policymakers (18, 19). This study, therefore, stands as a testament to the continuous evolution of cardiovascular medicine and the ongoing efforts to improve patient care and health system efficiency in the face of challenging chronic conditions like heart failure.

MATERIAL AND METHODS

The study was designed as a comprehensive, retrospective cohort analysis, carried out in a state-of-the-art tertiary care cardiac center over a three-month period. The primary objective of this research was to identify the key factors that contribute to the readmission of patients diagnosed with heart failure (HF).

The population under study comprised a cohort of 1,000 patients, with a predominant male representation of 80%. These individuals were selected based on their established history of HF and instances of subsequent hospital readmissions. The cohort presented a varied age range, with the mean age calculated at 58 years. This demographic representation provided a broad perspective on the impact of HF across different age groups (20).

For inclusion in the study, patients were required to be 18 years or older, have a diagnosis of HF, and have been readmitted within six months following their initial discharge from the hospital. The study excluded patients who were readmitted for planned elective procedures, those who were discharged before the commencement of the data collection period, and individuals with cognitive impairments that rendered them unable to provide informed consent (21).

Data collection was executed through an exhaustive review of the patients' medical records. This review covered a wide range of information, including demographic details, comprehensive clinical history, specifics of the initial hospitalization, and information regarding subsequent readmissions. Special attention was given to variables such as the length of the hospital stay, the presence of comorbid conditions like diabetes and hypertension, and the primary etiology of HF. This thorough approach ensured a multifaceted understanding of the factors influencing readmissions.

For the analysis of the collected data, descriptive statistical methods were employed. These methods facilitated the summarization and interpretation of the data regarding patient demographics, comorbidities, and reasons for readmission. The results were meticulously organized into tables and figures, providing a clear and comprehensive depiction of the various factors that influence readmissions in HF patients. This approach was instrumental in ensuring that the findings were presented in an accessible and informative manner, facilitating a better understanding of the complexities surrounding HF management and readmissions.

RESULTS

The results provide a comprehensive overview of the patient demographics, comorbidities, and the primary reasons for readmission among individuals with heart failure (HF).

Table 1, focusing on patient demographics and comorbidities, reveals a predominantly male cohort, with men constituting 80% (800 patients) of the total study population (N=1000). The female representation was 20% (200 patients). The mean age of the patients was 58 years, indicating a middle-aged to elderly cohort. In terms of hospital stay, the median duration was recorded as 6 days, suggesting a relatively short hospitalization period for the majority of the patients.

The prevalence of comorbidities was notably high in this cohort. A significant 78% (780 patients) of the study population had diabetes, while 56% (560 patients) suffered from hypertension. These comorbid conditions are often associated with the exacerbation of HF symptoms and could be contributing factors to the readmission rates. The primary cause of HF in the majority of the patients was ischemic cardiomyopathy, which was observed in 82% (820 patients) of the cases. This indicates a strong correlation between ischemic heart disease and the development of HF in this patient population.

Table 2 elucidates the reasons for readmission among the patients. The most common reason, cited in 42% (420 patients) of the cases, was a lack of counseling. This suggests a significant gap in patient education and support post-discharge, which could

contribute to readmission. Underdosage of medication was the reason for 16% (160 patients) of readmissions, pointing to potential issues in medication management or patient understanding of treatment protocols.

Table 1 Patient Demographics and Comorbidities

Variable	Total Patients (N=1000)	Percentage (%)
Gender		
Male	800	80
Female	200	20
Mean Age (Years)	58	
Median Hospital Stay (Days)	6	
Comorbidities		
Diabetes	780	78
Hypertension	560	56
Primary Cause of HF		
Ischemic Cardiomyopathy	820	82

Table 2 Reasons for Readmission

Reason for Readmission	Number of Patients	Percentage (%)
Lack of Counseling	420	42
Underdosage of Medication	160	16
Non-compliance to Medication	130	13
Volume Overload	110	11
Secondary Hypertensive Failure	90	9
Infections	60	6
Anemia	20	2
Progressive Renal Failure	10	1

Non-compliance to medication was another notable reason, accounting for 13% (130 patients) of the readmissions. This emphasizes the importance of adherence to prescribed treatment in managing HF. Volume overload and secondary hypertensive failure were also common reasons, contributing to 11% (110 patients) and 9% (90 patients) of readmissions, respectively. These conditions are directly related to the management of HF and indicate potential areas for improvement in patient care.

Infections were responsible for 6% (60 patients) of the readmissions, while anemia and progressive renal failure were less common causes, leading to 2% (20 patients) and 1% (10 patients) of readmissions, respectively. These findings highlight the multifactorial nature of HF management, where both cardiac and non-cardiac factors play a significant role in patient outcomes.

DISCUSSION

The study titled "Heart Failure Readmissions: A Deep Dive into Patient Demographics, Comorbidities, and Systemic Challenges" provides an extensive analysis of factors contributing to heart failure (HF) readmissions. It was observed that comorbid conditions, notably diabetes and hypertension, were highly prevalent in the cohort, emphasizing their intricate role both as risk factors and complicating elements in the management of HF. Reflecting on the current trends in HF management, the median hospital stay of six days suggests effectiveness in treatment strategies. However, this statistic also raises questions about optimizing hospital stay lengths to balance efficient management against healthcare resource utilization. One of the study's crucial findings was the predominance of ischemic cardiomyopathy as the primary HF cause, which was true for 82% of the cases. This finding corroborates previous research, highlighting the significant impact of coronary artery disease in HF pathogenesis and the necessity for robust cardiovascular risk factor management.

The revelation that lacks counseling led to 42% of readmissions is a critical insight, underlining the need for improved patient education and engagement in self-care practices. This aligns with existing literature advocating patient-centered approaches in chronic disease management. Additionally, the study identified underdosage of medication in 16% of patients as a significant factor. This issue, coupled with the non-compliance to medication regimens contributing to 13% of readmissions, points to the need for

optimizing drug therapy and addressing the challenges in ensuring adherence, especially given the complexity of HF treatment regimens.

Volume overload, causing 11% of readmissions, highlights the importance of fluid management in HF. Similarly, secondary hypertensive failure was a notable factor in 9% of patients, emphasizing the need for better blood pressure control. The study also found infections to be responsible for 6% of readmissions, showcasing the complications that comorbid conditions can bring to HF management. Although less common, anemia and progressive renal failure were still relevant causes of readmission, observed in 2% and 1% of patients, respectively. These findings are consistent with existing research indicating that both conditions are associated with poorer outcomes in HF patients.

Sevilla-Cazes, 2018 concluded a range of factors contribute to heart failure readmissions, including patient challenges in home management (22), distressing symptoms, illness progression, psychosocial factors, self-care adherence, and health system failures by Retrum, 2012 (23). Process improvements, particularly those addressing noncardiac causes and comorbidities, are crucial in reducing readmissions (24). However, guidelines often fail to address the needs of patients with multiple comorbidities and the elderly, highlighting a gap in care (25). These findings underscore the need for a multifaceted, patient-centered approach to reducing heart failure readmissions.

The predominance of male patients (80%) in the study aligns with literature suggesting gender differences in HF prevalence and outcomes, indicating a potential need for gender-specific management strategies in HF. The study, however, has limitations due to its retrospective nature and focus on a single tertiary care center, which might limit the generalizability of the findings. Additionally, the reliance on patient medical records for data collection could introduce information bias.

CONCLUSION

In conclusion, the study sheds light on various critical factors influencing HF readmissions, including patient demographics, comorbidities, and systemic issues in healthcare delivery. The findings suggest that addressing these aspects through targeted interventions, such as personalized patient education and tailored medication management, could significantly improve patient outcomes and reduce HF readmissions' burden.

REFERENCES

1.   Agarwal MA, Fonarow GC, Ziaeian B. National trends in heart failure hospitalizations and readmissions from 2010 to 2017. JAMA cardiology. 2021;6(8):952-6.

2.   Roger VL. Epidemiology of heart failure: a contemporary perspective. Circulation research. 2021;128(10):1421-34.

3.   Al-Tamimi MA-A, Gillani SW, Abd Alhakam ME, Sam KG. Factors associated with hospital readmission of heart failure patients. Frontiers in pharmacology. 2021;12:732760.

4.   Wolfe JD, Joynt Maddox KE. Heart failure and the affordable care act: past, present, and future. JACC: Heart Failure. 2019;7(9):737-45.

5.   Ferro EG, Secemsky EA, Wadhera RK, Choi E, Strom JB, Wasfy JH, et al. Patient readmission rates for all insurance types after implementation of the hospital readmissions reduction program. Health Affairs. 2019;38(4):585-93.

6.   Wideqvist M, Cui X, Magnusson C, Schaufelberger M, Fu M. Hospital readmissions of patients with heart failure from real world: timing and associated risk factors. ESC heart failure. 2021;8(2):1388-97.

7.   Awan SE, Bennamoun M, Sohel F, Sanfilippo FM, Chow BJ, Dwivedi G. Feature selection and transformation by machine learning reduce variable numbers and improve prediction for heart failure readmission or death. PloS one. 2019;14(6):e0218760.

8.   Reddy YN, Borlaug BA, editors. Readmissions in heart failure: it's more than just the medicine. Mayo Clinic Proceedings; 2019: Elsevier.

9.   Wang N, Gallagher R, Sze D, Hales S, Tofler G. Predictors of frequent readmissions in patients with heart failure. Heart, Lung and Circulation. 2019;28(2):277-83.

10.   Su A, Al'Aref SJ, Beecy AN, Min JK, Karas MG, editors. Clinical and socioeconomic predictors of heart failure readmissions: a review of contemporary literature. Mayo Clinic Proceedings; 2019: Elsevier.

11.   Kwok CS, Abramov D, Parwani P, Ghosh RK, Kittleson M, Ahmad FZ, et al. Cost of inpatient heart failure care and 30-day readmissions in the United States. International Journal of Cardiology. 2021;329:115-22.

12.   Sandhu AT, Heidenreich PA. Comparison of the change in heart failure readmission and mortality rates between hospitals subject to hospital readmission reduction program penalties and critical access hospitals. American Heart Journal. 2019;209:63-7.

13. Patil S, Shah M, Patel B, Agarwal M, Ram P, Alla VM, editors. Readmissions among patients admitted with acute decompensated heart failure based on income quartiles. Mayo Clinic Proceedings; 2019: Elsevier.

14. Lahewala S, Arora S, Tripathi B, Panaich S, Kumar V, Patel N, et al. Heart failure: same-hospital vs. different-hospital readmission outcomes. International journal of cardiology. 2019;278:186-91.

15. Gupta R, Maitz T, Egeler D, Mehta A, Nyaeme M, Hajra A, et al. SGLT2 inhibitors in hypertension: Role beyond diabetes and heart failure. Trends in cardiovascular medicine. 2022.

16. Blecker S, Herrin J, Li L, Yu H, Grady JN, Horwitz LI. Trends in hospital readmission of medicare-covered patients with heart failure. Journal of the American College of Cardiology. 2019;73(9):1004-12.

17. Ryan CJ, Bierle R, Vuckovic KM. The three Rs for preventing heart failure readmission: review, reassess, and reeducate. Critical care nurse. 2019;39(2):85-93.

18. Senot C. Continuity of care and risk of readmission: An investigation into the healthcare journey of heart failure patients. Production and Operations Management. 2019;28(8):2008-30.

19. Psotka MA, Fonarow GC, Allen LA, Joynt Maddox KE, Fiuzat M, Heidenreich P, et al. The hospital readmissions reduction program: nationwide perspectives and recommendations: a JACC: heart failure position paper. JACC: Heart Failure. 2020;8(1):1-11.

20. Foroutan F, Rayner DG, Ross HJ, Ehler T, Srivastava A, Shin S, et al. Global comparison of readmission rates for patients with heart failure. Journal of the American College of Cardiology. 2023;82(5):430-44.

21. Upadhyay S, Stephenson AL, Smith DG. Readmission rates and their impact on hospital financial performance: a study of Washington hospitals. INQUIRY: The Journal of Health Care Organization, Provision, and Financing. 2019;56:0046958019860386.

22. Sevilla-Cazes J, Ahmad FS, Bowles KH, Jaskowiak A-L, Gallagher TR, Goldberg LR, et al. Heart Failure Home Management Challenges and Reasons for Readmission: a Qualitative Study to Understand the Patient's Perspective. Journal of General Internal Medicine. 2018;33:1700-7.

23. Retrum JH, Boggs JM, Hersh AM, Wright LA, Main DS, Magid DJ, et al. Patient-Identified Factors Related to Heart Failure Readmissions. Circulation: Cardiovascular Quality and Outcomes. 2013;6:171–7.

24. Dong R, Mutharasan RK. The Role of Process Improvements in Reducing Heart Failure Readmissions. Journal of Clinical Outcomes Management. 2020;27:184-90.

25. Iyngkaran P, Liew D, Neil C, Driscoll A, Marwick TH, Hare DL. Moving From Heart Failure Guidelines to Clinical Practice: Gaps Contributing to Readmissions in Patients With Multiple Comorbidities and Older Age. Clinical Medicine Insights Cardiology. 2018;12.