



## Prevalence of Heart Failure and Frequency of its Risk Factors Among Heart Failure Patients: A Study in the Internal Medicine Ward of Mirwais Regional Hospital

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### Abstract

Heart failure is a global problem that is associated with significant morbidity, mortality, and healthcare expenditures worldwide. This study aimed to identify the prevalence of heart failure and the frequency of its different risk factors among heart failure patients in Mirwais Regional Hospital in Kandahar, Afghanistan. This study is a hospital-based cross-sectional study, and data is collected from heart failure patient populations by a standard questionnaire. A total of 1623 patients were admitted to the internal medicine ward of Mirwais Regional Hospital during the study period, and 114 patients had heart failure. Hence, its prevalence is 7%. Of these 114 patients, 50.1% were male, the remaining 49.9% were female. Research is limited on the incidence of heart failure in Afghanistan. It is essential to conduct region-centric research on the prevalence of heart failure to make evidence-based strategies to decrease the burden of heart failure in the country.

**Keywords:** Heart failure; Low Income Countries; Heart Failure Risk Factors

### Background

A healthy and normal heart pumps nearly 23,000 liters of blood in a day into the human body delivering oxygen and other necessary nutrients [1]. Therefore, a healthy heart is essential for the human body and general health. However, people develop heart failure from various causes and risk factors that negatively impact their performance and life quality. Nearly 55 million deaths happened worldwide in 2017, and 17.7 million were caused by cardiovascular diseases [2]. Heart failure is a challenge to public health in developing and developed countries [3]. Heart failure is a chronic condition associated with remarkable mortality, morbidity, poor life quality, and economic burden on the health system [3]. Heart failure in low- and middle-income countries such as Afghanistan, where continuation and coverage of care are limited, is accompanied by a higher rate of mortality, morbidity, and frequent and extended hospitalization [1,4].

Heart failure is defined from various perspectives on different platforms that lack standardization [5]. Some definitions entail diagnostic features of the clinical syndrome [5], and some focus on the hemodynamic and physiological spectrum [6]. Heart failure is a complex clinical syndrome associated with signs and symptoms resulting from heart structural and functional abnormalities [7].

### Causes of heart failure

Several systemic, hereditary, and cardiac conditions can cause heart failure. The etiology of heart failure might vary from region to region – ischemic heart diseases are the prevalent causes of heart in high-income countries [8]. Alternatively, hypertension, rheumatic heart diseases, cardiomyopathy, and myocarditis are the common causes of heart failure in developing countries [9]. According to the Global Burden of Disease Study results, more than two-thirds of heart failures are caused by ischemic heart disease,

chronic obstructive lung diseases, hypertensive heart disease, and rheumatic heart disease [9]. Worldwide, ischemic heart disease causes the highest proportion of heart failure and hypertensive heart disease, chronic obstructive lung diseases, cardiomyopathies, rheumatic heart disease, [10]; see Figure 1.

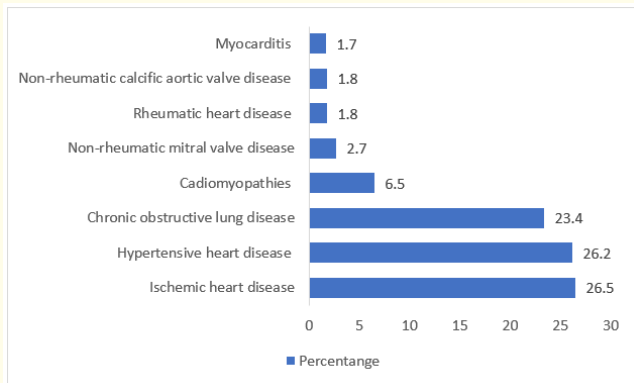


Figure 1

As the causes of heart failure are proportionately different in many parts of the world, to mitigate the burden of heart failure locally, it is essential to develop evidence-based and informed interventions to decrease the burden of heart failure [10]. Therefore, developing countries, including Afghanistan, must conduct region-centric research to discover unique causes of heart failure to make strategies to decrease the disease burden in the country.

### Diagnosis of heart failure

Signs and symptoms, laboratory tests, and echocardiograms are used to diagnose heart failure. Each diagnostic tool has a different percentage of specificity and sensitivity. Multiple diagnostic methods are used to diagnose heart failure. One of the standard diagnostic approaches to heart failure is the use of Framingham diagnostic criteria, which requires the presence of two major criteria, or one major and two minor criteria. Framingham diagnostic criteria are widely accepted with high specificity and low sensitivity [11]. In developing countries with limited resources, providers commonly depend on Framingham's criteria for diagnosis of heart failure. Still, Framingham criteria are poorly sensitive and restricted to the advanced heart failure patient population [11].

Universal Definition and Classification of Heart Failure			
Definition	Stage		Classification by Ejection Fraction
Heart failure is not a lone pathological diagnosis but a clinical syndrome consisting of cardinal symptoms (e.g., breathlessness, ankle swelling, and fatigue) that signs may accompany (e.g., elevated jugular venous pressure, pulmonary crackles, and peripheral edema). It is due to a structural and functional abnormality of the heart that results in high intracardiac pressures and inadequate cardiac output at rest and/or during exercise, and corroborated by at least one of the following: -elevated natriuretic peptide levels -objective evidence of cardiogenic pulmonary or systemic congestion.	<b>At Risk (Stage A)</b>	Patient at risk for heart failure, but without current or prior symptoms or signs of heart failure and without structural cardiac changes or elevated biomarkers of heart disease.	HF with reduced EF (HFrEF) -HF with LVEF <40%
	<b>Pre-Heart Failure (Stage B)</b>	Patients without current or prior symptoms or signs of heart failure with evidence of one of the following: -Structural Heart Disease -Abnormal cardiac function -Elevated natriuretic peptide or cardiac troponin levels	HF with mildly reduced EF (HFmrEF) -HF with LVEF 41-49%
	<b>Heart Failure (Stage C)</b>	Patients with current or prior symptoms and/or signs of HF caused by a structural and/or functional cardiac abnormality	HF with preserved EF (HFpEF) -HF with LVEF >50%
	<b>Advanced Heart Failure (Stage D)</b>	Severe symptoms and/or signs of HF at rest, recurrent hospitalizations despite GDMT, refractory or intolerant to GDMT, requiring advanced therapies transplantation, mechanical circulatory support, or palliative care.	HF with improved EF (HFimpEF) -HF with a baseline LVEF of <40%, a 10-point increase from baseline LVEF, and a second measurement of LVEF of >40%

Figure 2 : Source: Bozkurt, Biykem., et al. "Universal definition and classification of heart failure: a report of the heart failure society of America, heart failure association of the European society of cardiology, Japanese heart failure society and writing committee of the universal definition of heart failure". Journal of cardiac failure 27.4 (2021): 387-413.

Studies on the epidemiology of heart failure in developing countries, including Afghanistan, are limited and available data on heart failure in developing is driven by the hospital. However, population-based data is limited. This study aims to investigate the prevalence of heart failure and find the frequency of various risk factors in heart failure patients in the internal medicine ward of Mirwais Regional Hospital.

**Research question**

What is the prevalence of heart failure and frequency of different risk factors among heart failure patients in the internal medicine ward of Mirwais Regional Hospital?

**Period of study**

This study is conducted between Apr-2019 to Aug-2019.

**Study design and results**

A cross-sectional study of heart failure is conducted in patients admitted to the internal medicine ward of Mirwais Regional Hospital, and all patients admitted to the internal medicine ward are counted to find the prevalence of heart failure. Patients with heart failure are followed to complete the questionnaire to obtain information, and diagnosis of heart failure is based on Framingham criteria and echocardiography.

During the study period, 1623 patients were admitted to the internal medicine ward of Mirwais Regional Hospital. Among admitted patient populations, 114 patients had heart failure.

A total of 114 patients participated in the study; 50.1% were men, and 49.9% were women; see Table 1 for 114 patients’ demographics and Table 2 for their behavioral characteristics.

Characteristics	Number	Percentage
Sex:		
Male	58	50.1
Female	56	49.9
Age:		
18-49	23	20.2
50-59	12	10.5
60-69	30	26.3
70-79	35	30.7
80-100	14	12.3
Residency:		
Rural	76	66.7
Urban	38	33.3

Education:		
Illiterate	84	73.7
Baccalaureate	24	21
Religious education	6	5.3
Occupation:		
Carpenter	2	1.8
Driver	3	2.6
Farmer	34	29.8
Housewife	54	47.4
Mullah Imam	2	1.8
Mechanics	2	1.8
Shopkeeper	15	13.2
Student	2	1.8
Income:		
High income	9	7.9
Low income	75	65.8
Middle income	30	26.3

**Table 1:** Demographics of the 114 Patients with Heart Failure.

Characteristics	Frequency	Percentage
Awareness:		
Aware	34	29.8
Unaware	80	70.2
Smoking:		
Smoker	35	30.7
Non-smoker	79	69.3
Exercise hours in a day:		
15 minutes a day	15	13.2
More than 30 minutes a day	99	86.8
Fruits consumption in a week:		
Less than 3 times	104	91.2
More than 3 times	10	8.8
Vegetable consumption in a week:		
Less than 5 times	16	14
More than 5 times	98	86
Type of oil consumption:		
Vegetable oil	99	86.8
Animal Oil	15	13.2

**Table 2:** Behavioral Characteristics of the 114 Patients with Heart Failure.

### Heart failure risk factors

Among 114 participants, the percentage of risk factors were that 49.1% had hypertension, 33.3% coronary artery disease, 27.2% anemia, 14.9% diabetes mellitus, 14% COPD, 10.5% valvular heart diseases, 8.8% cardiomyopathy, 3.5% nutritional deficiencies, and 0.8% congenital heart diseases. Also, we found that 49.1% of participants had obesity, 30.7% were smokers, 3.5% had thyroid disease, and 0.9% had connective tissue disorder; see figure 3.

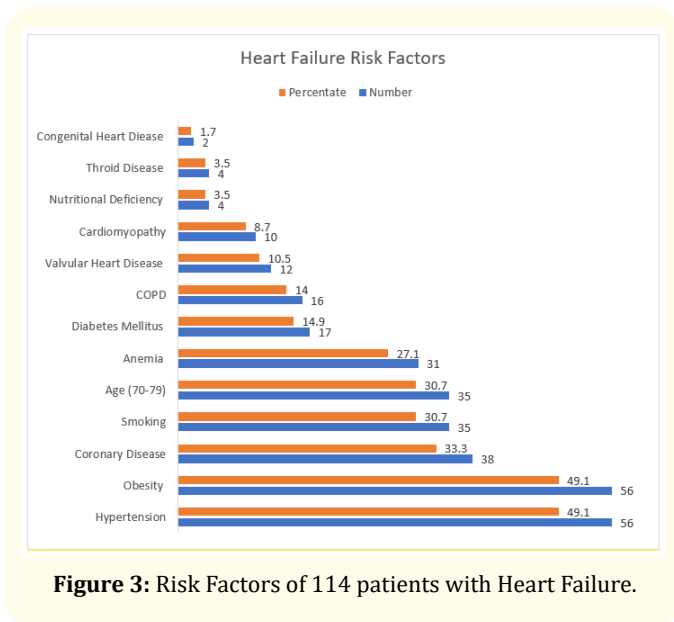


Figure 3: Risk Factors of 114 patients with Heart Failure.

### Discussion

In this study, 1623 patients were admitted to the adult internal medicine ward of Mirwais Regional Hospital, and 114 patients had heart failure, 7%, and the prevalence of heart failure is nearly 3.4% to 6.7% in the patient population admission to the hospital in Asian countries [12]. However, the data is limited on heart failure prevalence in Asian countries.

Coronary heart disease is a risk factor for heart failure. We found that coronary heart disease was the leading risk factor (33.3%) for heart failure. Multiple studies have highlighted that coronary heart disease is the most potent risk factor for heart failure development [13,14]. Exiguous resources for managing coronary artery disease (limited first-class medication, revascularization, and delays in door-to-balloon) are remarkable contributors to the development of heart failure in South Asian countries [15].

Multiple study results indicate that high blood pressure is a significant risk factor for heart failure in South Asia [16,17]. We found that 49.1% of heart failure patients had hypertension. High blood pressure awareness is poor, which can lead to suboptimal management among the population in South Asian countries [18]. Hypertension is a considerable risk factor for coronary heart disease and heart failure [19].

Diabetes mellitus is a potent risk factor for heart failure and coronary heart disease [20]. Our study showed that 14.9% of heart failure patients had diabetes mellitus. Studies highlight that diabetic cardiomyopathy causes myocardial dysfunction and clinical heart failure via different mechanisms, including myocardial fibrosis, atherogenesis, and dysfunctional remodeling that can finally lead to systolic heart failure [20,21]. Furthermore, in South Asian countries, suboptimal management of diabetes. For example, in India, the average glycosylated hemoglobin is 9% in the patient population with diabetes mellitus, further punctuating the risk of heart failure [20,22].

In South Asian countries use of tobacco products in the form of cigarettes and chewable tobacco is common among people [17]. Study results show that tobacco use is a risk factor for coronary artery disease and a potent independent risk factor for heart failure [23]. In our study, 30.7% of participants were tobacco users, and according to the World Health Organization, the prevalence of tobacco smoking is 39.8%, 41.9%, and 47.6% in Bangladesh, Pakistan, and China [24].

Obesity is a potent risk factor that leads to heart failure [25]. In this study, the results indicated that 49.1% of heart failure patients had obesity. Studies highlight increase in every 1 unit of body mass index can increase the risk of heart failure [26]. Studies indicate that abdominal obesity is prevalent in South Asian countries [17]. According to the Indian Council of Medical Research – India Diabetes, the prevalence of obesity ranges from 12% to 31% [27].

### Proposed initiatives for prevention

In the health sector, preventive measures are essential to improve population health. Healthcare officials in Afghanistan will need to prioritize decreasing cardiovascular diseases with a focus on heart failure. Decreasing health failure prevalence needs

strategies to decrease heart failure risk factors and early detection of heart failure with optimal management. the following steps are critical [28],

- Prioritizing policies to decrease exposure to cardiovascular risk factors
- Increasing taxation on tobacco products and banning their use in public areas
- Decreasing salt, sugar, and saturated fats in foods
- Improving awareness in the community on the vital role of physical activity and avoiding risk factors
- National policies to promote balanced urbanization and improve air quality
- Promoting cardiovascular screening programs
- Early detection of the disease and optimal management of the disease when present.

### Challenges

In developing countries, including Afghanistan, heart failure risk factors are further augmented by poor health system infrastructures. People do not have access to affordable and accessible care. Health care services are limited that cannot suffice the population's needs. Lack of appropriate care leads to poor management of acute and chronic heart failure risk factors [15,28].

### Limitation of the Study

This study was limited to one hospital, and the generalizability of the collected data is limited due to the unique population data for the target patient demographic. Data is from 2019 and does not allow any comparisons to the present prevalence rates for heart failure in the Afghan population.

### Conclusion

Heart failure is a leading cause of hospitalization in Mirwais Regional Hospital. The common risk factors among heart failure patients were hypertension and obesity, followed by coronary artery disease, smoking, and diabetes mellitus. Public health needs to increase people's access to healthcare services and improve their awareness of lifestyle modification to decrease the prevalence of heart failure. Management of heart failure risk factors via preventive measures such as healthy lifestyle, risk factor screening, and adequate management risk factors of heart failure can decrease the burden of heart failure in Kandahar.

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