

RISK FACTORS OF HEART FAILURE AMONG THE PATIENTS SUFFERING FROM HYPERTENSION ATTENDING A HOSPITAL IN ISLAMABAD, PAKISTAN

ABSTRACT

Objective: The aim of this study was to determine the risk factors of heart failure (HF) among patients of hypertension attending the cardiology unit of the tertiary care Hospital.

Methods: This Case-Control study was conducted from 1 April, 2020 to 1 May, 2021 at the Pakistan Institute of Medical Sciences, Islamabad. One hundred (100) patients of sex - and age - matched pairs were included in the study. Adults clinically diagnosed as cases of Hypertensive heart failure (HF) and individuals having systemic hypertension but no HF (controls) were included in the research. Cardiovascular risk factors were assessed by questioner. Assessment of the study variables was done and the data analysis was carried out using SPSS (IBM) 21.

Results: A total of one hundred (100) cases and 100 cases as controls were studied. The mean age of the study subjects was 38.4 ± 9.28 years and 38.35 ± 9.04 years of controls. Males were in majority in both groups. Obesity, renal impairment and hypertension in first degree relative were higher in the hypertensive heart failure than the control group. Average of proteinuria and serum creatinine level were higher among study subjects as compared to controls ($p < 0.05$). Medication adherences were considerably higher among the subjects of control group than the subjects of case group. Hypertension control group members were more inclined to eat vegetables and fruits on a daily basis, while there was no significant difference in the salt consumption between the cases and controls. History of anti-hypertensive drugs intake, lower intake of vegetables and fruits, and medication adherence represented the highest levels amongst the risk factors.

Conclusion: In the conclusion of current study, the particular lifestyle and poor dietary habits, medication adherence, and lack of exercise were observed to be the commonest risk factors of heart failure. Health education should be expanded in general and specialty care settings.

Keywords: Heart failure, high blood pressure, risk factor

Introduction

Hypertension, which affects 30% of the worldwide people, represents a serious health problem.[1] Hypertension is linked to a variety of disorders and can impair the brain, heart, lungs, and kidneys, as well as induce end-organ failure [1]. Hypertension is among the primary causes of cardiovascular disease, cardiovascular-related global morbidity & mortality, accounting for nearly 7.6 million deaths each year globally [1]. Hypertension is also among the primary risk factor for heart failure (HF) worldwide, particularly in Pakistan [2, 3]. The narrowing and blocking of blood vessels caused by high blood pressure (HBP or hypertension) increases your risk of developing heart failure. Despite advancements in the management of patients suffering from systemic hypertension and the emergence of effective anti-hypertensive drugs, the prevalence of HF resulting from hypertension tends to increase in Pakistan [2, 3]. In the Pakistani demographic, hypertensive heart failure (HHF) mostly affects the adults, resulting in loss of expertise and lower standard of living [5, 6]. In recent years, the investigation for epidemiologic risk factors of HF in the general populace has continued. In Pakistan, very a little is known regarding the unique and specific risk factors of HHF. The majority of researches conducted in Pakistan were descriptive in nature. Even though cardiovascular events-associated risk factors are common in people of all ages, the specific risk factors that cause HHF have yet to be identified [7]. Understanding the risks and predictors of HF in at-risk groups

is essential for a preventive healthcare strategy to reduce the epidemic of HF in cases with hypertension. As a result, it is necessary to identify and depict the risk factors of HF in Pakistan. The RISK-HHF investigation is a case-control research study that aims to identify and characterise risk factors for hypertensive HF in Pakistan. This study aims to assess the strength of relativeness between Hypertensive Heart Failure (HF) and different modifiable risk factors of cardiovascular events, as well as to identify the specific blend of risk factors accountable for overall HF risks among Pakistani hypertensive patients who are susceptible to low-cost cardiovascular prevention.

Material and Methods

This cross-sectional study was done at medicine and cardiology department of Pakistan Institute of Medical Sciences, Islamabad. Study duration was 12 months from May 2020 to April 2021. All the patients with age of 28 years or older, with a clinically diagnosed hypertension-induced Heart failure and hospitalised for the first time, either of gender were included, whereas for the controls, inclusion criteria included a previously diagnosed case of asymptomatic hypertension or a diagnosis of HF and their first visit to the cardiology clinic. Systemic hypertension patients without HF who had recently been referred to the cardiology clinic for therapy continuation throughout the research period were selected as controls using a simple random sample technique from the hospital's record. In a 1:1 ratio, the controls and cases were enrolled. All the cases and controls those having HF due to another cause, had a previous myocardial infarction or ischemic cardiac disease history, chronic obstructive pulmonary disease (COPD) and pregnant women were excluded. Complete medical history, clinical examination and echocardiography was done to assess the heart failure. A questioner form was used to collect data, and responses were confirmed using clinical notes. A venous blood specimen (5ml) was drawn from all individuals, and serum creatinine and serum urea were determined. A urine specimen of 10 mL was collected for dipstick urinalysis. Proteinuria was considered as significant where trace proteinuria on dipstick were more than the standard. All the demographic information including suspected risk factors for the heart failure were documented via questioner-based study proforma. Data was analyzed by using SPSS version 20.

RESULTS

A total of one hundred (100) cases were studied. The mean age of the study subjects was 38.4 ± 9.28 years (cases) and 38.35 ± 9.04 years (controls). Males were in majority in both groups. Hypertensive heart failure cases showed higher respiratory rates but lower blood pressures (systolic & diastolic) in comparison to controls. Statistically insignificant difference was seen between the both groups in terms of pulse rate. Obesity levels, renal impairment and hypertension in first degree relative were higher in the hypertensive heart failure than the control group. However, diabetes was higher in the subjects of control group and the biochemical profile of both groups is also represented in **Table: 1**

Medication adherences were considerably higher among the subjects of control group than the subjects of case group. The participants of control group were more likely to have been on antihypertensive medicines regularly than the individuals who developed hypertensive heart failure (cases). (**Table: 2**) Hypertension control group members were more inclined to eat vegetables and fruits on a daily basis as compared to hypertensive heart failure (cases) individuals. However, there was no significant difference in the salt consumption between the cases (4.7) and controls (4.73).

History of anti-hypertensive drugs intake, daily lower intake of vegetables and fruits, and medication adherence represented the highest levels amongst the risk factors. Medication observance showed 67%, followed daily fruits and vegetables with 46%. Proteinuria was declared as 20%, while eGFR displayed negligible level of 5.3%. Fig.1

Table 1: Baseline characters of study participants n=200

Variables	Cases (n=100)	Controls (n=100)	P- Value
Age	38.4±9.28	38.35±9.04	0.944
BMI	26.1±3.09	25.9±2.9	0.016
SBP	121.5±7.16	129.75±11.64	0.017
DBP	81.9±7.64	90.4±10	0.072
Respiratory Rate	21.2±2.5	19.58±2.86	0.154
Gender	Male	62(62.0%)	0.069
	Females	38(38.0%)	
Marital Status	Married	81(81.0%)	0.003
	Un-Married	19(19.0%)	
History of diabetes	21(21.0%)	35(35.0%)	0.05
Obesity	14(14.0%)	10(10.0%)	
Renal impairment	25(25.0%)	10(10.0%)	
Proteinuria	42.3±5.4	11.9±2.8	0.03
Serum Urea	33.8±3.5	34.2±3.57	0.01
Serum Creatinine	1.1±0.28	0.9±0.25	0.46
eGFR	70.3±4.4	90.0±6.66	0.06

Table 2: Lifestyle risk factors in the participants n=200

Variables		Cases (n=100)	Controls (n=100)	P- Value
Exercise	Not at all	32(32.0%)	20(20.0%)	0.05
	Occasional	47(47.0%)	25(25.0%)	
	As recommended	1(18.0%)	55(55.0%)	
Smoking	Never	15(15.0%)	41(41.0%)	0.01
	Occasional	44(44.0%)	44(44.0%)	
	Continues smoker	38(38.0%)	15(15.0%)	
Medication adherence	High	22(22.0%)	43(43.0%)	0.01
	Medium	28(28.0%)	27(27.0%)	

	Low	50(50.0%)	30(30.0%)	
Estimated salt intake per day (grams)		4.7±1.2	4.73±1.2	0.01
Fruit & Vegetable Intake	Daily	23(23.0%)	50(50.0%)	0.05
	Weekly	38(38.0%)	35(35.0%)	
	Monthly	39(39.0%)	15(15.0%)	

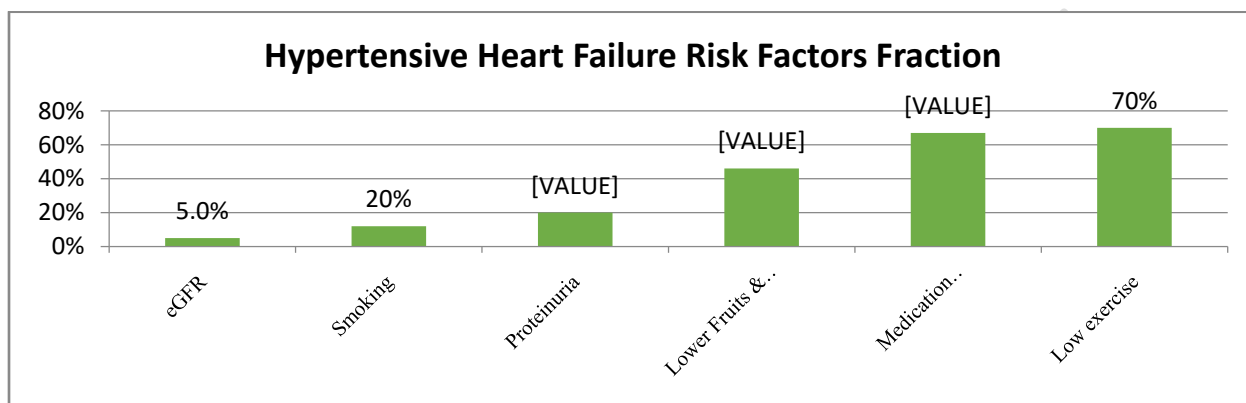


Figure 1: Risk factors of heart failure among hypertensive individuals n=100

DISCUSSION

In this study, mean age of study cases was 38.4 ± 9.28 years and mean age of study controls was 38.35 ± 9.04 years. This is in accordance with the findings by Almas A et al. [8] who have stated a higher mean age of 39.4 ± 8.28 years and 39.65 ± 6.04 among patients with hypertensive HF and controls respectively. There was exactly equal number of both sexes in both the groups. The patients were carefully chosen to reduce perplexing from age and sex. The rate of smoking is in line with other research epidemiologic studies in the over-all population and also in hypertensive and heart failure patients [9]. Cigarette smoke is a vasculotoxic, atherogenic, and pro-inflammatory mediator triggering the cytokines release that activates the Renin-Angiotensin-Aldosterone System (RAAS) with subsequent myocardial toxicity, adverse hemodynamics and depression [9]. Interestingly, smoking was not a significant risk factor of HF in our study. Dietary habits should be mentioned in the title role. Despite the fact that daily vegetable and fruit consumption fell just short of statistical significance ($p = 0.05$) in association analysis, the conclusion is clinically significant. In the study by Jafary FH et. al [10], daily vegetable and fruits consumption decreased 30% relative risk in cases of acute myocardial infarction; the subjects who had low levels of serum beta-carotene showed 2.78-fold greater risk of HF according to antioxidant beneficial effects of carotenoids. In this investigation, salt intake and keeping salts on the dining tables were not linked with the risk of HHF. The individuals' salt intake was within the acceptable levels. Excessive salt consumption in the general population increases Glomerular filtration rate (GFR), blood volume, and may aggravate or precipitate

hypertension in susceptible people. Given the ascertainment bias in assessing dietary consumption of vegetables, fruits, and salt, it is difficult to get a conclusion on the role of dietary behaviours in hypertensive heart failure. In this study, less than 50% of individuals in each group exercised in some way. Sedentary lifestyles and inadequate exercise have been identified as risk factors for cardiovascular disease in the general populace. It has been shown that performing aerobic exercise of moderate-intensity fewer than 150 minutes per week predisposes to dyslipidaemia and obesity, which leads to cardiovascular deconditioning and insulin resistance [39, 40]. Surprisingly, neither diabetes nor obesity were linked to an increased risk of hypertensive HF in this research. In Pakistan, further research is needed to determine the impact of exercise in the risk of HHF. In the current study, high medication adherence was low (22%) in the study cases and high (43%) in study controls, who had been diagnosed as hypertensive cases for a long time. Proteinuria, serum creatinine, serum urea, and approximated glomerular filtration rate all had a significant correlation with the risk of HHF. In the present study proteinuria was significantly raised in cases (42.3 ± 5.4) as compared to the controls (11.9 ± 2.8). Mueed A et al. [11] have also revealed that Even after controlling for other cardiovascular risk factors, proteinuria is a significant indicator of cardiac events in HF patients. The patients in this study's case group had lower mean systolic and diastolic (121.5 ± 7.16 and 81.9 ± 7.64 respectively) blood pressures, although having a greater respiratory rate (21.2 ± 2.5), which is consistent with chronic sympathetic HF, which leads in poorer cardiovascular fitness in the long term. In this study, obesity was not related to the heart failure even though it was present significantly in both the groups (cases and controls). This is conflicting to the study and other published studies by Oguntade AS et al. [12] and Levy D et al. [13]. The 'obesity paradox' has been attributed to thinness in HF patients.[14] In conclusion, the significant unfavourable risk factors of HF among hypertension cases in this study were proteinuria levels and poor medication adherence, whereas the protective risk factors were approximate glomerular filtration rates and daily consumption of vegetable and fruits. The study's strengths include the matching of cases and controls, which decreases the confounders of age and gender in HF risk. Another feature of this study is the implementation of an authorized medication adherence questionnaire, which reduces subjectivity in patient categorization. Furthermore, the risk variables identified in this study might serve as a focus for community health preventative activities. This research is not without limitations. As per study findings the hypertensive patients at high risk of heart failure. Furthermore, the prevalence of ischemic cardiac disease in Pakistan remains low, and hypertension still accounts for the majority of heart failure episodes in our demographic.

CONCLUSION

In the conclusion of current study, the particular lifestyle and poor dietary habits, medication adherence, and lack of exercise were observed to be the commonest risk factors of heart failure. Health education should be expanded in general and specialty care settings. Establishing a specific medication adherence clinic may help to identify individuals with poor medication adherence who may be at a greater risk of heart failure in a timely manner. All tertiary health

institutes should build a comprehensive heart failure registry. This will help with future large-scale investigations and the validation of these findings. To summarise, a bigger case-control study, or possibly a cohort study, is necessary to corroborate the findings of this investigation on a greater scale.

Ethical Approval:

As per international standard or university standard ethical approval has been collected and preserved by the authors.

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