



**PREVALENCE OF RISK FACTORS FOR CONGESTIVE HEART FAILURE IN
WESTERN U.P: A HOSPITAL BASED STUDY**

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ABSTRACT

Objective: To estimate the prevalence of risk factors for congestive heart failure in a group of Indian adults.

METHOD: The present study was conducted on 150 admitted CHF patients, for a period of 2 years at a tertiary care hospital in western UP; Meerut. **RESULT:** In our present study out of 150 patients (125-male and 25-female) hypertension was found to be a major risk factor (78.7%) followed by OSA (58.7%), Diabetes (57.3%), MI (53.3%), Smoking (46.7%), Alcohol (30%), Dyslipidemia (26.7%), Familyhistory of CAD, CKD, hypertension, diabetes (3-13%) **CONCLUSION:** Considering burden of disease community based primary prevention strategies have to be implemented to reduce the high risk factors of CHF.

KEYWORDS: congestive heart failure, western UP.

INTRODUCTION

The incidence of and mortality from Congestive Heart Failure (CHF) have been increasing and become important public health and clinical problems". Congestive Heart Failure (CHF) is a chronic disease characterized by the inability of the heart to pump an adequate amount of blood to achieve the demand of the different organ systems or doing so at increased filling pressures. It is a serious condition representing the end-stage of a myriad of other cardiac diseases without a curative treatment. Once diagnosed, medication is required for the rest of the patient's life to improve their life quality and survival.^[1]

Heart failure (HF) is a common cardiovascular condition with increasing incidence and prevalence.^[2] The incidence and prevalence estimates of heart failure (HF) are unreliable in India because of the lack of surveillance systems to adequately capture these data.

WHO Global Burden of Disease study places HF in several categories within cardiovascular disease, including ischemic, hypertensive, inflammatory and rheumatic heart disease (RHD).^[4]

Few population-based epidemiologic studies.^[5,6,7] have examined the risk factors for CHF. In the Framingham Heart Study, CHD, hypertension, left ventricular hypertrophy, valvular heart disease and diabetes were associated with an increased risk of CHF.^[8] Multiple risk

factor intervention does result in small reductions in risk factors including blood pressure, cholesterol and smoking.

There is inadequate data about the magnitude of the problem of Congestive Heart Failure & its risk factors among adult population of India (esp. West U.P.). So to estimate the burden of the disease in adults, study was conducted which will help in setting strategies for prevention and control of risk factors for Congestive Heart Failure and will also assist in health promotion and in averting future cardiovascular diseases.

AIMS AND OBJECTIVES

To estimate the prevalence of risk factors for congestive heart failure in a group of Indian adult subjects coming for treatment in Anand hospital, U.P Meerut.

METHODOLOGY

Study Design

The present study was started in August 2012-August 2014 in Department of Medicine, Anand Hospital, Meerut (U.P). The study comprised of 150 admitted CHF patients, who fulfilled the inclusion criteria.

Subjects

- 150 Indian adults (> 18 years) selected presenting with congestive heart failure in Anand Hospital, Meerut; Uttar Pradesh.
- All patients with CHF and NYHA class II, III, or IV.
- EF <40%.
- Subjects with diastolic heart failure with preserved LV systolic function.
- Pregnant or lactating women with peripartum cardiomyopathy.
- Hemoglobin between 9.0 g/dL-12.0 g/dL.
- Patient's current and past medical condition and status assessed using previous medical history, physical evaluation and the physicians (principle investigator's) medical opinion.

Exclusion Criteria

- Subjects less than 18 years.
- Subjects not given consent.
- Patient with dyspnoea, with pneumonia.
- Significant chronic pulmonary disease.
- Patient was simultaneously participating in another device or drug study, or had participated in any clinical trial involving an experimental device or drug, including other drugs or devices enhancing cardiac neovascularisation.
- Patients who were unwilling or unable to cooperate with study procedure.
- Patient with a malignancy which could have influenced the prognosis.

Written informed consent was taken from all subjects.

OBSERVATIONS**Prevalence of risk factors in CHF Patients**

It was evident that out of 150 admitted patients of CHF, Hypertension was more prevalent (78.7%) among all risk factors followed by O.S.A (58.7%), Diabetes (57.3%), M.I (53.3%), Smoking (46.7%), Alcohol (30%), Dyslipidemia (26.7%), Family history of C.A.D (13.3%), C.K.D(10%), Family history of Hypertension (10%), P.P.C.M.P. (3.3%) and Family history of D.M. (3.3%) as shown in Table 1 and same depicted in Pie-Chart.

Table1: Prevalence of different risk factors in CHF Patients.

Risk Factors	Prevalence
Hypertension	78.7
Diabetes	57.3
MI	53.3
Smoking	46.7
Alcohol	30
OSA	58.7
CKD	10
PPCMP	3.3
Dyslipidemia	26.7
Family history of DM	3.3
Family history of Hypertension	10
Family history of CAD	13.3

Age and Sex distribution

In our study the overall age of patients ranged between 24-89 years, with mean age of 48.7 years for patients whose age were less than or equal to 60 years and 73.5 years for patients whose age were more than 60 years as shown in bar graph below. There were 125 male patients (83.33%) and 25 female patients (16.67%) with M:F=5:1

Age and Gender association with individual risk factor for CHF**1. Hypertension**

Hypertension was more prevalent (61.9%) in patients whose age were more than 60 years as compared to the patients whose age were less than or equal to 60 years (38.1%) out of total 118 hypertensive patients and in male patients (83.1%) as compared to the female patients (16.9%). The association of hypertension with age and sex category as shown in table 2 and table 3.

Table 2: Association of Hypertension with Age Category in CHF Patients.

Age Category	Hypertension		Total	p value
	Yes	No		
≤ 60 yrs	45	8	53	
% within AGECA	84.9%	15.1%	100.0%	
% within HT	38.1%	25.0%	35.3%	
> 60 yrs	73	24	97	.16
% within AGECA	75.3%	24.7%	100.0%	
% within HT	61.9%	75.0%	64.7%	
Total	118	32	150	
% within AGECA	78.7%	21.3%	100.0%	
% within HT	100.0%	100.0%	100.0%	

Table 3: Association of Hypertension with Gender in CHF Patients.

Sex	Hypertension		Total	p value
	Yes	No		
Male			125	.54
% within Sex	98	27	100.0%	
% within HT	78.4%	21.6%	83.3%	
	83.1%	84.4%		
Female	20	5	25	
% within Sex	80.0%	20.0%	100.0%	
% within HT	16.9%	15.6%	16.7%	
Total	118	32	150	
% within Sex	78.7%	21.3%	100.0%	
% within HT	100.0%	100.0%	100.0%	

Diabetes

Among 86 of total diabetic patients, diabetes was more prevalent (75.6%) in patients whose age were more than

60 years as compared to the patients whose age were less than or equal to 60 years (24.4%), with male patients (84.9%), predominating the female patients (15.1%).

Table 4: Association of Diabetes with Age Category in CHF Patients.

Age Category	DIABETES		Total	p value
	Yes	No		
≤ 60 yrs			53	.001
% within AGECA	21	32	100.0%	
% within DIABETES	39.6%	60.4%	35.3%	
	24.4%	50.0%		
> 60 yrs	65	32	97	
% within AGECA	67.0%	33.0%	100.0%	
% within DIABETES	75.6%	50.0%	64.7%	
Total	86	64	150	
% within AGECA	57.3%	42.7%	100.0%	
% within DIABETES	100.0	100.0%	100.0%	

Table 5: Association of Diabetes with Gender in CHF Patients.

Sex	DIABETES		Total	p value
	Yes	No		
Male			125	.55
% within Sex	73	52	100.0%	
% within DIABETES	58.4%	41.6%	83.3%	
	84.9%	81.3%		
Total	86	64	150	
% within Sex	57.3%	42.7%	100.0%	
% within DIABETES	100.0%	100.0%	100.0%	
Female	13	12	25	
% within Sex	52.0%	48.0%	100.0%	
% within DIABETES	15.1%	18.8%	16.7%	

Myocardial Infarction

Myocardial Infarction was more prevalent (61.3%) in patients whose age were more than 60 years as compared to the patients whose age were less than or equal to 60

years (38.8%) among 80 Myocardial Infarction patients. M.I. was also more prevalent in male patients (81.3%) as compared to the female patients (18.8%).

Table 6: Association of MI with Age Category in CHF Patients.

Age Category	M.I.		Total	p value
	Yes	No		
≤ 60 yrs			53	.35
% within AGECA	31	22	100.0%	
% within M.I.	58.5%	41.5%	35.3%	
	38.8%	31.4%		
> 60 yrs	49	48	97	
% within AGECA	50.5%	49.5%	100.0%	
% within M.I.	61.3%	68.6%	64.7%	
Total	80	70	150	
% within AGECA	53.3%	46.7%	100.0%	
% within M.I.	100.0%	1 0.0%	100.0%	

Table 7: Association of MI with Gender in CHF Patients.

Sex	M.I.		Total	p value
	Yes	No		
Male			125	
% within Sex	65	60	100.0%	
% within M.I.	52.0%	48.0%	83.3%	
	81.3%	85.7%		
Female	15	10	25	.46
% within Sex	60.0%	40.0%	100.0%	
% within M.I.	18.8%	14.3%	16.7%	
Total	80	70	150	
% within Sex	53.3%	46.7%	100.0%	
% within M.I.	100.0%	100.0%	100.0%	

Smoking

Out of total 70 smoker patients, smoking was more prevalent (54.3%) in patients whose age were more than

60 years as compared to the patients whose age were less than or equal to 60 years (45.7%). Male patients (92.9%) dominated over female patients (7.1%) in smoking.

Table 8: Association of Smoking with Age Category in CHF Patients.

Age Category	SMOKING		Total	p value
	Yes	No		
≤ 60 yrs			53	.013
% within AGECA	32	21	100.0%	
% within Smoking	60.4%	39.6%	35.3%	
	45.7%	26.3%		
> 60 yrs	38	59	97	
% within AGECA	39.2%	60.8%	100.0%	
% within Smoking	54.3%	73.8%	64.7%	
Total	70	80	150	
% within AGECA	46.7%	53.3%	100.0%	
% within Smoking	100.0%	100.0%	100.0%	

Table 9: Association of Smoking with Gender in CHF Patients.

Sex	SMOKING		Total	p value
	Yes	No		
Male			125	.003
% within Sex	65	60	100.0%	
% within Smoking	52.0%	48.0%	83.3%	
	92.9%	75.0%		
Female	5	20	25	
% within Sex	20.0%	80.0%	100.0%	
% within Smoking	7.1%	25.0%	16.7%	
Total	70	80	150	
% within Sex	46.7%	53.3%	100.0%	
% within Smoking	100.0%	100.0%	100.0%	

Alcohol

Patients whose age were less than or equal to 60 years, alcohol was more prevalent (57.8%) as compared to the patients whose age were more than 60 years (42.2%)

among 45 total Alcoholic patients, with male patients (88.9%) were alcoholic as compared to the female patients (11.1%).

Table 10: Association of Alcohol with Age Category in CHF Patients.

Age Category	ALCOHOL		Total	p value
	Yes	No		
≤ 60 yrs			53	<.001
% within AGECA	26	27	100.0%	
% within Alcohol	49.1%	50.9%	35.3%	
	57.8%	25.7%		
> 60 yrs	19	78	97	
% within AGECA	19.6%	80.4%	100.0%	
% within Alcohol	42.2%	74.3%	64.7%	
Total	45	105	150	
% within AGECA	30.0%	70.0%	100.0%	
% within Alcohol	100.0%	100.0%	100.0%	

Table 11: Association of Alcohol with Gender in CHF Patients.

Sex	ALCOHOL		Total	p value
	Yes	No		
Male	40	85	125	.23
% within Sex	32.0%	68.0%	100.0%	
% within Alcohol	88.9%	81.0%	83.3%	
Female	5	20	25	
% within Sex	20.0%	80.0%	100.0%	
% within Alcohol	11.1%	19.0%	16.7%	
Total	45	105	150	
% within Sex	30.0%	70.0%	100.0%	
% within Alcohol	100.0%	100.0%	100.0%	

Obstructive Sleep Apnea

It was observed that among 88 patients with obstructive sleep apnea, OSA was more prevalent (62.5%) in patients whose age were more than 60 years as compared to the patients whose age were less than or equal to 60

years (37.5%). OSA was more prevalent in male patients (84.1%) as compared to the female patients (15.9%). The tables described the insignificant association of OSA with gender and age in CHF patients.

Table 12: Association of OSA with Age Category in CHF Patients.

Age Category	OSA		Total	p value
	Yes	No		
≤ 60 yrs	33	20	53	.51
% within AGECA	62.3%	37.7%	100.0%	
% within OSA	37.5%	32.3%	35.3%	
> 60 yrs	55	42	97	
% within AGECA	56.7%	43.3%	100.0%	
% within OSA	62.5%	67.7%	64.7%	
Total	88	62	150	
% within AGECA	58.7%	41.3%	100.0%	
% within OSA	100.0%	100.0%	100.0%	

Table 13: Association of OSA with Gender in CHF Patients.

Sex	OSA		Total	p value
	Yes	No		
Male	74	51	125	.76
% within Sex	59.2%	40.8%	100.0%	
% within OSA	84.1%	82.3%	83.3%	
Female	14	11	25	
% within Sex	56.0%	44.0%	100.0%	
% within OSA	15.9%	17.7%	16.7%	
Total	88	62	150	
% within Sex	58.7%	41.3%	100.0%	
% within OSA	100.0%	100.0%	100.0%	

Chronic Kidney Disease

Among 15 total patients of Chronic Kidney Disease, it was more prevalent (73.3%) in patients whose age were

more than 60 years as compared to the patients whose age were less than or equal to 60 years (26.7%) and all were male patients.

Table 14: Association of Chronic Kidney Disease with Age Category in CHF Patients.

Age Category	CKD		Total	p value
	Yes	No		
≤ 60 yrs	4	49	53	.46
% within AGECA	7.5%	92.5%	100.0%	
% within CKD	26.7%	36.3%	35.3%	
> 60 yrs	11	86	97	
% within AGECA	11.3%	88.7%	100.0%	
% within CKD	73.3%	63.7%	64.7%	
Total	15	135	150	
% within AGECA	10.0%	90.0%	100.0%	
% within CKD	100.0%	100.0%	100.0%	

Table 15: Association of Chronic Kidney Disease with Gender in CHF Patients.

Sex	CKD		Total	p value
	Yes	No		
Male	15	110	125	.07
% within Sex	12.0%	88.0%	100.0%	
% within CKD	100.0%	81.5%	83.3%	
Female	0	25	25	
% within Sex	0%	100.0%	100.0%	
% within CKD	0%	18.5%	16.7%	
Total	15	135	150	
% within Sex	10.0%	90.0%	100.0%	
% within CKD	100.0%	100.0%	100.0%	

Dyslipidemia was more prevalent (70%) in patients whose age were more than 60 years and in male patients (97.5%) as compared to the patients whose age were less than or equal to 60 years (30%) and female patients (2.5%).

Table 17: Association of Dyslipidemia with Age Category in CHF Patients.

Age Category	DYSLIPIDEMIA		Total	p value
	Yes	No		
≤ 60 yrs	12	41	53	.41
% within AGECA	22.6%	77.4%	100.0%	
% within DYSLIPIDEMIA	30.0%	37.3%	35.3%	
> 60 yrs	28	69	97	
% within AGECA	28.9%	71.1%	100.0%	
% within DYSLIPIDEMIA	70.0%	62.7%	64.7%	
Total	40	110	150	
% within AGECA	26.7%	73.3%	100.0%	
% within DYSLIPIDEMIA	100.0%	100.0%	100.0%	

DISCUSSION

Heart failure, which is increasing in prevalence in many areas of the world, can be defined as a progressive complex clinical syndrome characterized by inadequate systemic perfusion to meet the body's metabolic demands as a result of impaired cardiac function. The primary cardiac mechanism that underlies the clinical syndrome of heart failure is systolic and diastolic dysfunction; usually in combination.^[8] HT and diabetes are the two cardinal causes of heart failure. Very few patients have their blood pressure (BP) under good control and most of others progresses to heart failure. BP control continues to be important in reducing cardiovascular risk. HT should not be considered in isolation because other risk factors such as plasma lipid levels, cigarette smoking and presence of diabetes mellitus, obesity and family history of cardiovascular disease have also been a considerable impact on the progression of heart failure.^[94]

In the present study, out of 150 patients of CHF - 125(83.3%) were male and 25(16.67%) were female. Hypertension was found to be a major risk factor (78.7%) for the progression of heart failure. This was followed by O.S.A (58.7%), Diabetes Mellitus (57.3%), M.I (53.3%), Smoking (46.7%), Alcohol (30%), Dyslipidemia (26.7%), Family history of C.A.D (13.3%), C.K.D (10%), Family history of Hypertension (10%), P.P.C.M.P. (3.3%) and Family history of Diabetes Mellitus (3.3%).

Various studies.^[9,10,11] conducted in past states that hypertension is the major cause of heart failure and incidences increases along with other risk factors. Pulmonary hypertension and cor pulmonale were studied as a common cause of HF in India, considering the prevalence of valvular heart diseases and chronic obstructive airway diseases (COPD) in the community. In present study the association of hypertension with age category was studied and it was noted that the patients whose age were less than or equal 60 years, among 53 of total patients, 45(84.9%) were hypertensive and 8(15.1%) were non hypertensive, while the patients whose age were more than 60 years, among 97 of total patients, 73(75.3%) were hypertensive and 24(24.7%) were non hypertensive. Further it was observed that among 118 total hypertensive patients, hypertension was more prevalent (61.9%) in patients whose age were more than 60 years, as compared to the patients whose age were less than or equal to 60 years(38.1%). Although among our group of patients there is insignificant association of hypertension with age category (p value=.16). It was observed that among 118 total hypertensive patients, hypertension was more prevalent in male patients (83.1%) as compared to the female patients (16.9%).

As studied earlier the prevalence of diabetes in India has been increasing.^[12] the incidence of HF has been demonstrated to increase from 2.3 per 1000 person-years

for a HbA1c <6% to 11.9 per 1000 person years for a HbA1c >11.9 In diabetic subjects, age, diabetes duration, insulin use, ischemic heart disease and elevated serum creatinine were independent risk factors for both prevalent and incident CHF. In our study prevalence of diabetes is 57.3% prevalent in 150 patients of CHF. Also the association of diabetes with age category was conducted in the present study which proved to be significant with p value=.001. On evaluation it was seen that among 86 total diabetic patients, diabetes was more prevalent (75.6%) in patients whose age were more than 60 years, as compared to the patients whose age were less than or equal 60 years (24.4%). It may be noted that among 86 total diabetic patients diabetes was more prevalent in male patients (84.9%) as compared to the female patients (15.1%).

In one of the study which was done at CHF clinic, cardiothoracic and neurosciences centre outpatient department, All India Institute of Medical Sciences, New Delhi, India^[13], 50 CHF patients and 50 healthy controls participants were interviewed using Epworth Sleepiness Scale, Modified Berlin Questionnaire, Kansas City Cardiomyopathy Questionnaire, and Quebec Sleep Questionnaire, to assess the prevalence of obstructive sleep apnoea (OSA) and associated quality of life (QOL) among CHF patients and to ascertain the relationship of OSA with excessive daytime sleepiness and selected demographic, clinical, and anthropometric characteristics. It was found that 18% and 8% prevalence of OSA in the CHF and control groups, respectively. The prevalence of OSA was comparable in males and females following the same path in our study, it was found that the prevalence of OSA is 58.7% in all C.H.F patients. It was seen that the patients whose age were less than or equal to 60 years, among 53 of total patients, 33(62.3%) were having OSA and 20(37.7%) were having non OSA. On the other hand the patients whose age were more than 60 years, among 97 of total patients, 55(56.7%) were with OSA and 42(43.3%) were with non OSA. OSA was also found to be more prevalent (62.5%) in patients whose age were more than 60 years male patients (84.1%) as compared to the female.

Dyslipidemia another risk factor in CHF, found to be 26.7% prevalent. Although there was no significant association of Dyslipidemia with age category but more prevalent in male patients compared to female patients (p value=.003).

Our study explained that Hypertension, O.S.A, Diabetes, M.I, Smoking, Alcohol and Dyslipidemia among the major risk factors for CHF, while other risk factors contributing to CHF in our study were-Family history of C.A.D, patients with C.K.D, Family history of Hypertension, P.P.C.M.P. and Family history of D.M.

CONCLUSION

Considering burden of disease, community based primary prevention strategies have to be implemented to

reduce the risk factors for congestive heart failure. Patients should be educated about early screening and regular monitoring of blood pressure, blood sugar, renal and lipid profile and educating patients if any positive family history present. Further studies should be recommended to know more about the prevalence of risk factors for congestive heart failure in different parts of India.

REFERENCES

1. American Heart Association. Heart Disease and Stroke Facts, 2006 Update. Dallas, Texas: AHA, 2006.
2. Rosamond W, Flegal K, Friday G, Furie K, Go A, Greenlund K et al. Heart disease and stroke statistics 2007 update: a report from the American Heart Association Statistics Committee and Stroke Statistics Subcommittee. *Circulation*, 2007; 115: e69-171.
3. Mendez GF, Cowie MR. The epidemiological features of heart failure in developing countries: A review of the literature. *Int J Cardiol.*, 2001; 80: 213-19.
4. World Health Organization. Global burden of disease—2004 update. Geneva: Switzerland, 2004.
5. Levy D, Larson MG, Vasan RS, Kannel WB, Ho KK. The progression from hypertension to congestive heart failure. *JAMA.*, 1996; 275:1557-1562.
6. Chen YT, Vaccarino V, Williams CS, Butler J, Berkman LF, Krumholz HM. Risk factors for heart failure in the elderly: a prospective community-based study. *Am J Med.*, 1999; 106:605-612.
7. Chae CU, Pfeffer MA, Glynn RJ, Mitchell GF, Taylor JO, Hennekens CH. Increased pulse pressure and risk of heart failure in the elderly. *JAMA.*, 1999; 281:634-639.
8. Levy D, Larson MG, Vasan RS, Kannel WB, Ho KK. The progression from hypertension to congestive heart failure. *JAMA*, 1996; 275(20): 1557-62.
9. *Indian Journal of Clinical Practice*, February, 2012; 22(9).
10. Verdecchia P. Cardiac failure in hypertensive cardiopathy. *Ital Heart J.*, 2000; 1(Suppl 2): 72-7.
11. Chen, Y.T., Vaccarino, V., Williams, C.S. et al. Risk factors for heart failure in the elderly: a prospective community-based study. *Am J Med.*, 1999; 106: 605-612.
12. Rodgers A, Ezzati M, Vander Hoorn S, Lopez AD, Lin RB, Murray CJ. Comparative risk assessment collaborating group distribution of major health risks: Findings from the global burden of disease study. *PLoS Med.*, 2004; 1: e27.
13. Patidar AB, Andrews GR, Seth S *J Cardiovasc Nurs.* 2011 Nov-Dec; 26(6): 452-9. doi:10.1097/JCN.0b013e31820a048e.