SOCIO-CLINICAL DEMOGRAPHICS AND RISK FACTORS FOR HEART FAILURE AT A TERTIARY HOSPITAL IN SOUTH-SOUTH NIGERIA: A CROSS-SECTIONAL STUDY

OO Eseoghene[1], OJ Osarenkhoe[2], IA Azeez[3], OH Aiwuyo[1], A Kweki[1], AM Osagioduwa[1], O Aisosa[4], OA Ogunniyi[2], U Okhuaihesuyi[1], AK Adeyemo[5], A Adetona[2], HK Alade[2], E Umuerri[1], F Aigbe[1], A Obasohan[4]

1. Delta State University Teaching Hospital, Nigeria
2. Afe Babalola University, Ado-Ekiti, Nigeria
3. College of Medicine, Federal University of Health Sciences, Ila-Orangun, Nigeria
4. University of Benin Teaching Hospital, Nigeria
5. Nigerian Police Academy Wudil, Kano, Nigeria

Correspondence:
Dr. I.A. Azeez
Department of Family Medicine, Federal University of Medical Sciences, Ila-Orangun, Nigeria
E-mail: kunleayilola14@gmail

Submission Date: 25th July, 2024
Date of Acceptance: 26th Dec, 2025
Publication Date: 31st Dec, 2025

ABSTRACT

Introduction: **Heart failure is a major cause of morbidity and mortality among patients globally. It is a prevalent syndrome with poor prognosis, for which identification of variables that increase mortality and are treatable might lead to improved survival. This study aimed** to **find the pattern of socio-clinical demographics and the risk factors of heart failure at a tertiary hospital in Nigeria.**

Methods: **This was a cross-sectional study done looking at 175 inpatient and outpatient heart failure cases diagnosed using Framingham's criteria and transthoraxic echocardiography.**

Results: **The mean age was 56.33+/-16.94 years. There were more males than females, with a male to female ratio of 1.2:1. Majority(54.3%) of the patients studied were in the occupational class I(Senior public servants, professionals, managers, large scale traders, businessmen and contractors). About 15% of patients had no formal education, while about 40% had a tertiary level education. A majority had a history of hypertension (61.1%), while about 25% had a history of diabetes. There was a history of alcohol use in 44% of participants with a history of angina being present in about 20% of patients. Fifteen percent had a history of tobacco use, while the least represented risk factors were history of valvular heart disease (3.4%), family history of sudden death (2.9%), and family history of heart disease (0.1%).**

Conclusion: **Heart failure was more common in middle age group, males, married individuals, social class 1 and those with a tertiary level of education. Orthopnea was the most common presenting feature. Hypertensive heart disease was the most common risk factor, and other risk factors included diabetes and alcohol use.**

INTRODUCTION

Heart failure (HF) is a prevalent syndrome with a poor prognosis, for which identification of variables that increase mortality and are treatable might lead to improved survival. Studies have shown that the worse the degree of heart failure, the poorer the outcome. Chronic heart failure (CHF) with predominant left ventriclar (LV) systolic dysfunction is frequently complicated by secondary changes in the morphology and function of the right ventricle (RV).[1-3]

It is now increasingly known that the development, progression, prognosis, and treatment of cardiovascular diseases do not only depend on the severity of the disease but are also influenced by demographic factors such as age and sex of the patient.[4] A study on the influence of sex on right ventricular dysfunction in patients with severely depressed left ventricular ejection fraction by Martinez *et al.* found that women with severe left ventricular systolic dysfunction had less right ventricular dysfunction (26.5% in women as against 38.5% in men) than men despite having similar haemodynamic parameters and left ventricular ejection fractions (LVEF). In the study, 385 participants were studied, all of whom had LVEF <35%. The study showed that in participants with the worst left ventricular function (LVEF<25%), right ventricular ejection fraction, hence right ventricular systolic function, was found to be better in women than in male participants.

It was also found by Martinez *et al* that female patients were significantly older than the male patients.[5]

Patients with right ventricular dysfunction were also found to be significantly older than those with normal right ventricular function in another study carried out in Kano, Nigeria, on patients with hypertensive heart disease.[6] In another study on the epidemiology of right ventricular dysfunction in heart failure with preserved ejection fraction, the male sex was found to be strongly associated with right ventricular dysfunction in heart failure with preserved ejection fraction despite a similar severity of pulmonary hypertension and pulmonary vascular indices between male and female participants.[7] It was also suggested in the study that there was a higher mortality rate among the male patients despite the reported overall female preponderance of heart failure with preserved ejection fraction.[7]

MATERIALS AND METHODS

The study was done at the Cardiology Unit of Delta State University Teaching Hospital (DELSUTH) located in Oghara, Delta State. The population of patients recruited were from amongst HF patients attending cardiology outpatient clinics and from in-patients admitted to the wards of the hospital.

Inclusion Criteria: Inclusion criteria for the study were all HF patients e"18 years confirmed to have heart failure.

Exclusion Criteria.1).Chronic lung diseases such as COPD (chronic obstructive pulmonary disease). These patients were excluded using a history of smoking and exposure to biomass fuels, cough associated with sputum production which is present for at least three months per year for two consecutive years and findings of hyperinflation, narrow mediastinum, flattened diaphragm on chest x-ray). Other chronic lung diseases such as occupational lung diseases, were also excluded using the history, physical examination and chest x-ray findings.2) Patients with estimated GFR of < 31 mL/ min/1.73m^2 3) and those who did not give consent.

Ethical considerations

Ethical approval was obtained from the Health Research Ethics Committee of the Delta State University Teaching Hospital, Oghara, Delta State. Informed consent was obtained from participants and was duly signed before they were co-opted for the study. Confidentiality and freedom or right to exit from the study at any time was maintained.

Data collection

Data were collected on socio-demographic features, medical history, family and social history including tobacco and alcohol consumption. Data were also collected from ECG and Echo findings.

Occupational Class

Patients were grouped into five classes based on their occupations. Group I includes
Senior public servants, professionals, managers, large scale traders, businessmen and
Contractors; Group II includes intermediate grade public servants and senior school
Teachers; Group III includes junior school teachers, drivers and artisans; Group IV includes Petty traders, labourers, messengers and similar grades and Group V includes unemployed, full-time housewives, students and subsistence farmers.

Statistical analysis

The obtained data were collated, cleaned, coded and entered into a secure, password-protected database. The data were analysed using SPSS version 26.0 statistics software. Descriptive statistics was expressed by frequency tables and percentages. The mean and standard deviations were used for continuous variables. One way Analysis of variance was used as inferential statistics and the level of significance was set at d" 0.05.

RESULTS

Socio-demographic characteristics of patients

Table 1 shows the sociodemographic characteristics of the study population. The mean age of the study population was 56.33±16.94years. Most of the patients were older than 65 years (32.0%). There were more males than females with a male to female ratio of 1.2: 1. Most of the patients in the study were married (77.7%) with over a quarter being single. Majority of the patients studied were in the occupational class I (54.3%) with 11.4%, 14.9% and 19.4% of all patients studied being in occupational Class II, III and IV respectively. About 15% of patients had no formal education while about 40% had a tertiary level education with the others either having secondary (26.9%) or primary (18.3%) level of education. The prevalence of right ventricular diastolic dysfunction in this study was 70.9%. Most of the patients (42.9%) with RV diastolic dysfunction had pseudonormal filling while about a fifth had impaired relaxation with 8.6% having a restrictive pattern.

Risk Factors for Heart Disease in Patients

Table 2 shows the risk factors for heart disease that were present in the study participants. Many of the patients had more than one risk factor present. Of 175 patients studied, a majority had history of hypertension (61.1%), while about 25% had a history of diabetes. There was history of alcohol use in 44%

Table 1: Socio-demographic characteristics of patients

Socio-demographic characteristic		Frequency (n)	Percentage (%)
Age (years)	18 - 25	4	2.3
	26 – 35	20	11.4
	36 – 45	27	15.4
	46 – 55	33	18.
	56 – 65	35	20.0
	>65	56	32.0
Mean Age = 56.33 ± 16.94			
Sex	Male	95	54.3
	Female	80	45.7
Marital status	Single	28	16.0
	Married	136	77.7
	Divorced	4	2.3
	Widowed	6	3.4
	Separated	1	0.6
Occupational class*	I	95	54.3
	II	20	11.4
	III	26	14.9
	IV	34	19.4
Level of education	None	26	14.9
	Primary	32	18.3
	Secondary	47	26.9
	Tertiary	70	40.0

*[*Occupational class I: senior public servants, professionals, managers, large scale traders, businessmen and contractors; II: intermediate grade public servants and senior school teachers; III: junior school teachers, drivers and artisans; IV: petty traders, labourers and messengers; V: unemployed, full time house wives, students and subsistence farmers*.]

of participants with history of angina being present in about 20% of patients. 15% had a history of tobacco use while the least represented risk factors were history of valvular heart disease (3.4%), family history of sudden death (2.9%) and family history of heart disease (0.1%)

Signs and Symptoms of Heart Failure in patients at baseline

Table 3 shows the signs and symptoms of heart failure that were present in patients at baseline. The commonest signs and symptoms in the patients studied were orthopnoea (78.9%), dyspnoea on exertion

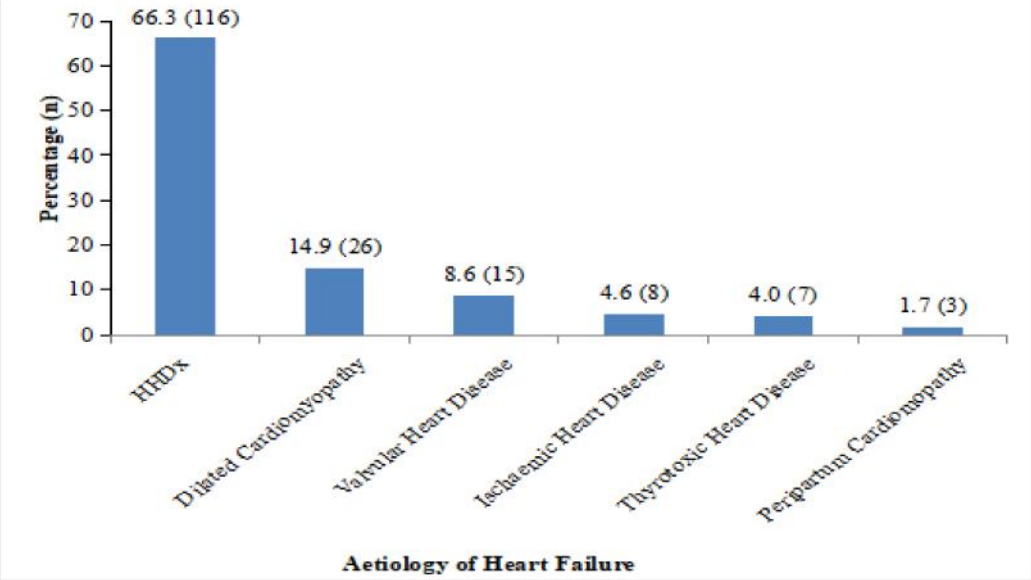

Figure 1: Aetiology of heart failure

HHDx: Hypertensive Heart Disease.

Table 2: Risk factors for heart disease in patients.

Medical history	Frequency (n)	Percentage (%)
History of Hypertension	107	61.1
Family history of heart disease	16	0.1
History of Diabetes Mellitus	44	25.1
Tobacco Smoker	26	14.9
Alcohol	77	44.0
Previous History of Left sided Valvular Heart Disease	6	3.4
Family History of Sudden Death	5	2.9
Previous History of Angina	36	20.6

(74.3%) cardiomegaly (69.1%), bilateral pedal oedema (65.1%), paroxysmal nocturnal dyspnea (63.4%), and nocturnal cough (56.6%). Other symptoms and signs present in these patients included weight loss, distended neck veins, rales, S3 gallop rhythm, pulmonary edema, hepatomegaly, pleural effusion and tachycardia.

Table 3: Signs and symptoms of heart failure in patients at baseline

Sign/Symptom	Frequency (n)	Percentage (%)
Paroxysmal Nocturnal Dyspnoea	111	63.4
Orhopnoea	138	78.9
Weight Loss	52	29.7
Distended neck Veins	61	34.9
Rales	41	23.4
S_3 Gallop Rhythm	37	21.1
Hepatojugular Reflux	23	13.1
Cardiomegaly	121	69.1
Pulmonary Oedema	29	16.6
Dyspnoea on Exertion	130	74.3
Nocturnal Cough	99	56.6
Hepatomegaly	60	34.3
Bilateral pedal oedema	114	65.1
Tachycardia	50	28.6
Pleural Effusion	19	10.9

Aetiology of Heart Failure

Figure 1 shows the aetiology of heart failure in the study population. The commonest aetiology of heart failure in this study was hypertensive heart disease present in over 60% of patients. Dilated cardiomyopathy was also present in 14.9% of patients while left sided valvular heart disease was present in 8.6% of patients with ischemic heart disease, Thyrotoxic heart disease and peripartum cardiomyopathy accounting for heart failure in 4.6%, 4.0% and 1.7% of patients in the study respectively.

New York Heart Association Classification of Patients at baseline

Figure 2 shows the classification of patients based on the New York Heart Association Classification at baseline. Majority of the patients studied were in class IV (40.6%) while the remaining 24.6%, 22.3% and 12.6% were in classes III, II and I respectively.

Anthropometric and Clinical Profile of Patients at baseline

Table 4 shows the anthropometric and clinical profile of patients at baseline. Participants with preserved LVEF had a higher mean BMI than others, but this difference was not statistically significant. Also, patients with reduced LVEF were noted to have a higher mean pulse rate of 89.18(19.23) bpm and a higher waist circumference of 76.79 (11.00)cm but lower mean systolic and diastolic blood pressures of 123.28 (18.79) mmHg and 81.29 (10.70) mmHg respectively, than the other two groups when compared. There were however no significant differences noted in these values when comparisons were made between the three groups.

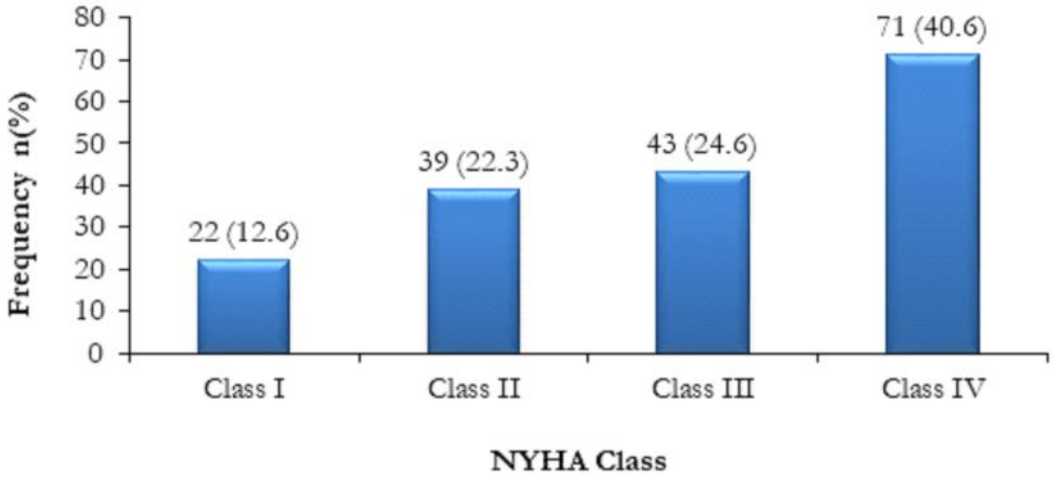

Figure 2: New York heart association classification of patients at baseline

NYHA: New York Heart Association {I: No limitation of physical activity, II: Slight limitation of physical activity, III: Marked limitation of physical activity, IV: Unable to carry out any physical activity without being symptomatic or symptoms of heart failure at rest.}

Table 4: Anthropometric and clinical profile of patients at baseline

	Left Ventricular Ejection Fraction				
	Reduced LVEF n = 78 mean (SD)	**Mid-Range LVEF** n = 34 mean (SD)	**Preserved LVEF** n = 63 mean (SD)	**F**	**p-value***
BMI (kg/m^2)	23.56 (3.57)	23.91 (3.69)	24.11 (3.95)	0.39	0.677
Pulse (bpm)	89.18 (19.23)	88.82 (17.14)	87.69 (19.51)	0.11	0.896
Systolic BP (mmHg)	123.28 (18.71)	126.50 (18.11)	126.67 (18.27)	0.71	0.496
Diastolic BP (mmHg)	81.29 (10.70)	82.82 (10.10)	82.75 (10.73)	0.42	0.657
WC (cm)	76.79 (11.00)	73.92 (9.87)	74.92 (10.12)	1.07	0.345

BMI – Body Mass Index; BP- Blood Pressure; WC – Waist Circumference,, Kg/m^2-Kilogram per metre square; b/m – beats per minute; mmHg – millimetres of mercury; cm – centimetres. LVEF: left ventricular ejection fraction.
Reduced LVEF : Reduced Left Ventricular Ejection Fraction (<40%)
Mid-Range LVEF: Mid-Range Left Ventricular Ejection Fraction (40% - 49%)
Preserved LVEF: Preserved Left Ventricular Ejection Fraction (e" 50%)
**Compared using One Way Analysis of Variance (ANOVA)*

Discussion

The mean age of the study population was 56.33 (±16.94) years which is in keeping with other studies done on heart failure patients.[10,11] There was a predominance of males in the study population which is similar to other studies in Nigeria and around the world. This observation may be attributed to certain lifestyle traits, such as tobacco use and alcohol ingestion, which are more commonly associated with males and puts them at increased cardiovascular risk.[12-16] There was high prevalence of right ventricular dysfunction among patients with heart failure in this study in concordance with the reports of another study conducted in Nigeria.[17]

Hypertension was the most common risk factor for heart failure in this study which was 61.1%, while some of the other risk factors for heart failure observed in this study were diabetes mellitus (25.1%), tobacco use (15%) and alcohol ingestion was 44%. Some of these findings are the same as those reported in another study.[18] However, there are some differences observed between this study and others, such as that done by Laabes et al where alcohol intake as a risk factor for heart failure was seen in 24% of their study population while it was observed to be more in this study. Furthermore, tobacco use was observed in a fewer participants in this study than has been observed in others.[19-27]

Hypertensive heart disease was shown to be the most common aetiology of heart failure, seen in 66.3% of patients in this study, which was in keeping with some previous studies. Most of the respondents were found to be in New York Heart Association class IV (40.6%) with a consistent decrease observed in the proportion of participants in functional class III, II and I (24.6%, 22.3% and 12.6%) respectively. This finding may be attributed to a general tendency in our society to present late to the hospital. It is, however, different from observations in other studies.[15, 24,27]

Limitations and Recommendation

This study was a cross-sectional study, therefore causal relationships between variables would be difficult to establish. A bigger experimental study would be able to establish causal relationships and improve the data obtained from this study. This study was a hospital-based study which would limit secondary generalization unlike a community study that would have wider generalization.

CONCLUSION

Heart failure was more common in the middle age group, males, married individuals, social class I and those with a tertiary level of education. Orthopnea was the most common presenting feature. Hypertensive heart disease was the most common risk factor, and other risk factors included diabetes and alcohol use. This study has opened more insights into the demographics and aetiology of heart failure among the studied population.

REFERENCE

1. **Javaheri S,** Shukla R, Zeigler H, Wexler L. Central sleep apnea, right ventricular dysfunction and low diastolic Blood Pressure are predictors of Mortality in Systolic Heart Failure. J Am Coll Cardiol 2007;49(20):2028-2034.

2. **Spinarová L,** Meluzín J, Toman J, *et al.* Right Ventricular Dysfunction in Chronic Heart failure Patients. Eur J Heart Fail. 2005;7(4):485-489.
3. **Meluzín J,** Spinarova´L, Dusek L, *et al.* Prognostic importance of the right ventricular function assessed by Doppler tissue imaging. Eur J Echocardiogr 2003;4(4):262–271.
4. **Lima Dos Santos CC,** Matharoo AS, Pinzón Cueva E, *et al.* The Influence of Sex, Age, and Race on Coronary Artery Disease: A Narrative Review. Cureus. 2023;15(10):e47799.
5. **Martinez-Selles M,** Munoa MD, Martinez E, *et al.* The Influence Of Sex on Right Ventricular Dysfunction in Patients with Severely Reduced Left Ventricular Ejection Fraction. Eur J Heart Fail 2006;8(4)400-403.
6. **Karaye KM,** Habib AG, Mohammed S, *et al.* Assessment of Right Ventricular Systolic Function using Tricuspid Annular Plane Systolic Excursion in Nigerians with Systemic Hypertension. Cardiovasc J Afr, 2010;21(4):186-190.
7. **Zakeri R,** Mohammed SF. Epidemiology of Right Ventricular Dysfunction in Heart Failure with Preserved Ejection Fraction. Curr Heart Fail Rep 2015;12(5):295-301.
8. **Groenewegen A,** Rutten FH, Mosterd A, Hoes AW. Epidemiology of heart failure. Eur J Heart Fail. 2020; 22(8):1342-1356.
9. **Lewsey SC,** Breathett K. Racial and ethnic disparities in heart failure: current state and future directions. Curr Opin Cardiol. 2021;36(3):320-328.
10. **Kitzman DW,** Rich MW. Age disparities in heart failure research. JAMA. 2010; 304(17):1950-1951.
11. **Bozkurt B,** Ahmad T, Alexander KM, *et al.* Writing Committee Members. Heart Failure Epidemiology and Outcomes Statistics: A Report of the Heart Failure Society of America. J Card Fail. 2023 ;29(10):1412-1451.
12. **Ogah O.S,** Stewart S, Falase A.O, *et al.* Contemporary profile of acute heart failure in Southern Nigeria: Data from the Abeokuta heart failure clinical registry, JACC: Heart Failure. 2014; 2(3):250-259.
13. **Oyedeji GA.** Socio-economic and cultural background of hospitalized children in Ilesa. Niger J Paediatr 1985;12:111-11GH7
14. **Adebayo SO,** Olunuga TO, Durodola A, Ogah OS. Heart failure: Definition, Classification and Pathophysiology- A Mini Review. Nig J Cardiol 2017;14:9-14.
15. **Owusu IK,** Adu-Boakye. Prevalence and Aetiology of Heart Failure in Patients seen at a Teaching Hospital in Ghana. J Cardiovasc Dis Diagn 2013, 1:5.
16. **Dokainish H,** Teo K, Zhu J, *et al.* Heart failure in low and middle income countries: background, rationale and design of the InterCHF (international congestive heart failure) study. Int J Cardiol 2015; 204:133-141
17. **Akintunde AA.** Right ventricular function in patients with heart failure in a cardiac clinic in Southwest Nigeria. Niger Med J. 2017;58(1):7-12.
18. **Oguntade AS,** Ajayi IO. Risk factors of heart failure among patients with hypertension attending a tertiary hospital in Ibadan, Nigeria: The RISK-HHF case-control study. PLoS One. 2021; 16(1):e0245734. doi: 10.1371/journal.pone.0245 734. PMID: 33493215; PMCID: PMC7833138.
19. **Ilaria S,** Lainscak M. Epidemiology and Prognosis of Heart Failure. Int Cardiovasc Forum J 2017;10.
20. **Dunlay SM,** Roger VL, Redfield MM. Epidemiology of heart Failure with preserved ejection fraction. Nat Rev Cardiol.2017;14(10):591-602
21. **Thomas CM.** Type 2 Diabetes and Heart Failure: Challenges and Solutions. Curr Cardiol Rev 2016;12:249-255
22. **Gana GJ,** Idris SH, Sabitu K, *et al.* Prevalence and Perception of Cigarette Smoking among out of School Adolescents in Birnin Kebbi, North Western Nigeria. Pan Afr Med J 2018;30:304.
23. **Laabes EP,** Thacher TO, Okeahialam BN. Risk factors for Heart Failure in Adult Nigerians. Acta cardiologica 2008;63(4):437-443.
24. **Okoshi MP,** Capalbo RV, Romeiro FG, Okoshi K. Cardiac Cachexia: Perspectives for prevention and treatment. Arq Bras Cardiol. 2017;108(1):74-80.
25. **Umuerri EM,** Aigbe FI, Aiwuyo HO, Obasohan AO. Pattern of cardiac diseases and diagnostic utility of transthoracic echocardiography in delta state university teaching hospital, Oghara, Nigeria. Afr J Tropi Med and Biomed Res 2015;2(2):20-27.
26. **Ojji DB,** Alfa J, Ajayi SO, Mamven MH, Falase AO. Pattern of heart failure in Abuja, Nigeria: an echocardiographic study. Cardiovasc J Afr.2009; 20(6):349-352.
27. **Ogah OS,** Sliwa K, Akinyemi JO, Falase AO, Stewart S. Hypertensive heart failure in Nigerian Africans: Insights from the Abeokuta Heart Failure Registry. J Clins Hypertens (Greenwich) 2015;17 (4):263-272.
28. **Shams P,** Tackling G, Borhade MB. Hypertensive Heart Disease. [Updated 2025 Apr 26]. In: StatPearls [Internet]. Treasure Island (FL): StatPearls Publishing; 2025 Jan-. Available from: https://www.ncbi.nlm.nih.gov/books/NBK539800/