Nusantara Medical Science Journal
Volume 11, Issue 1, January – June 2026
P-ISSN: 2460-9757, E-ISSN: 2597-7288
Nationally Accredited Journal, Decree 230/E/KPT/2022.

Original Article

Clinical and Epidemiological Profile of Cardiovascular Disease at Rantauprapat Hospital, North Sumatra: A Retrospective Study

Shazni Nadia Reivana[1], Kartika Karo[2], Farida Hanum Margolang[2], Husnah[3]

[1] *Rantauprapat Hospital, Labuhanbatu, North Sumatra, Indonesia*
[2] *Department of Cardiology, Rantauprapat Hospital, Labuhanbatu, North Sumatra, Indonesia*
[3] *Department of Clinical Nutrition, Faculty of Medicine, Universitas Syiah Kuala, Banda Aceh, Aceh, Indonesia*

Corresponding Author:
Name: Shazni Nadia Reivana
Email: shazninadia@gmail.com

ARTICLE INFO

Keywords:
Cardiovascular disease; Heart failure; Coronary artery disease; Epidemiology

How to cite:

DOI:

ABSTRACT

Introduction*: Cardiovascular disease (CVD) is a leading cause of global mortality, with a significant and growing burden in Asia. Despite this, local epidemiological data in specific regions of Indonesia remain limited. This study aims to describe the clinical and epidemiological profile of patients with CVD at a regional hospital in North Sumatra, Indonesia.*

Methods*: A retrospective, descriptive cross-sectional study was conducted using medical records from the cardiology outpatient clinic at Rantauprapat Hospital between January 1 and December 31, 2023. Data regarding patient age, sex, primary diagnosis, and comorbidities were extracted and analyzed descriptively.*

Results*: A total of 2,116 patients met the inclusion criteria. The majority of the patients were male (52.69%), with the largest age group being 51–60 years (33.13%). Primary heart disorders constituted 70.04% of the cases, predominantly heart failure (65.97%). Coronary and peripheral vascular diseases accounted for 29.63% of the cases, primarily driven by coronary artery disease (23.49%). Additionally, hypertension was identified as the most prevalent concurrent comorbidity, affecting 35% of*

the study population.
***Conclusion**: Heart failure and coronary artery disease are the most prevalent primary cardiovascular conditions among older adults at this regional hospital, significantly exacerbated by high rates of comorbid hypertension. These findings emphasize the urgent need for enhanced primary care interventions and targeted cardiovascular risk factor management within this population.*

1. INTRODUCTION

Despite advancements in effective and safe preventive strategies, cardiovascular disease remains the leading cause of morbidity and mortality globally, with 58% of cases occurring in Asia.[1] Nearly 39% of cardiovascular-related deaths are classified as premature (occurring before 70 years of age). Globally, ischemic heart disease accounts for 47% of cardiovascular deaths, followed by stroke at 40%.[1,2]

According to the 2024 report from the American Heart Association (AHA), 48.6% of Americans aged over 20 years have some form of cardiovascular disease, including coronary heart disease, heart failure, stroke, or hypertension.[3,4] Coronary artery disease continues to be a major contributor to global mortality. Asia, characterized by its large and diverse population, faces substantial challenges in the prevention and management of cardiovascular disease. Projections indicate a 91.2% increase in cardiovascular mortality by 2050.[5] In Southeast Asia, stroke is expected to become the leading contributor to mortality, followed by ischemic heart disease (112 deaths per 100,000 population) and hypertensive heart disease (19 deaths per 100,000 population).[5]

Modifiable cardiovascular risk factors include unhealthy diet, smoking, obesity, hypertension, dyslipidemia, and diabetes mellitus. Hypertension accounts for approximately 22% of heart disease cases, followed by elevated non-HDL cholesterol (8%), smoking (6%), central obesity (5%), and diabetes (5%).[5,6] In Indonesia, non-communicable diseases account for 71% of total deaths. The leading causes of mortality among individuals aged 30–70 years are cerebrovascular disease (20.7%), ischemic heart disease (14.9%), and diabetes mellitus (9.6%). Based on the 2018 National Basic Health Research (Riskesdas), the prevalence of heart disease in Indonesia was 1.5%, slightly higher in urban (1.6%) compared to rural areas (1.3%).[7]

Given the limited epidemiological data on heart disease in Indonesia, this study aims to contribute to the existing literature and provide a foundation for future academic research and public health policy development.

2. METHODS

Study Design and Setting

This study employed a descriptive cross-sectional design. Data were retrospectively extracted from the medical records of patients visiting the cardiology outpatient clinic at Rantauprapat Hospital, North Sumatra, during the period of January 1, 2023, to December 31, 2023 (**Figure 1**).

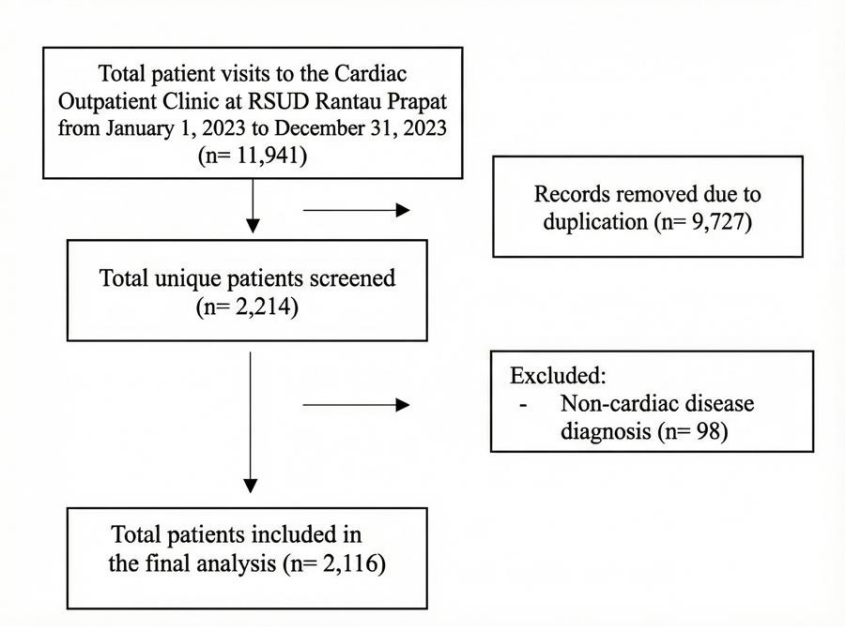

Figure 1. Flowchart of patient selection process

Study Population and Sampling

The sampling technique used was consecutive sampling. Inclusion criteria encompassed all patients attending the cardiology clinic within the study period whose medical records contained complete information regarding age, sex, and diagnosis. Patients with incomplete medical records or non-cardiac primary diagnoses were excluded.

Operational Definitions

To ensure diagnostic clarity and prevent data overlap, cardiovascular conditions were clearly categorized into primary diagnoses and secondary comorbidities. For the purpose of this study, 'Hypertensive Disease' was defined as a primary diagnosis when severe or uncontrolled hypertension was the principal reason for the cardiology visit. Conversely, 'Hypertension' was classified as a comorbidity when it was a pre-existing or secondary condition accompanying another primary cardiac diagnosis (such as heart failure or coronary artery disease).

Data Analysis

Univariate data analysis was performed. All continuous and categorical data were analyzed descriptively and presented in frequency distributions and percentages to describe the clinical and epidemiological characteristics of the study population.

Ethical Considerations

The study protocol was reviewed and approved by the Institutional Review Board (IRB) of Rantauprapat Hospital. Given the retrospective nature of the medical record review, the requirement for direct patient informed consent was waived. However, patient confidentiality was strictly maintained, and all data were completely anonymized prior to analysis.

3. RESULTS

A total of 2,116 patients were included in the study (**Table 1**). The mean age was 56.27 ± 12.52 years. The largest age group was 51–60 years (33.13%), while the smallest proportion was aged 0–10 years (0.43%). Male patients accounted for 52.69% of cases.

Table 1. Characteristics of patients

Characteristics		Frequency (N=2116)	Percentage (%)
Sex			
	Male	1115	52.69
	Female	1001	47.31
Age (years)	Mean ± SD	56.27 ± 12.52	
	0–10	9	0.43
	11–20	20	0.95
	21–30	50	2.36
	31–40	134	6.33
	41–50	356	16.82
	51–60	701	33.13
	61–70	650	30.72
	71–80	172	8.13
	81–90	22	1.04
	91–100	2	0.09
Ethnicity	Batak	635	39
	Minangkabau	529	25
	Javanese	571	27
	Malay	381	18
Socioeconomic Status	Low	1059	50
	Middle	740	35
	High	317	15
Referral Status	Referred	198	9.3
	-Surgical (Operative)	4	
	-Non-surgical (Conservative and intervention)	194	
	Not referred	1922	91.7

The predominant ethnic group was Batak (39%), followed by Javanese (27%), Minangkabau (25%), and Malay (18%). Most patients were of low socioeconomic status (50%). Only 9.3% of patients required referral to a higher-level hospital, while 91.7% were managed locally.

Regarding disease characteristics, disorders of the heart constituted 70.04% of cases, primarily heart failure (65.97%), followed by cardiomyopathy (2.74%), valvular

heart disease (0.85%), and rheumatic heart disease (0.47%) (**Table 2**). Coronary and peripheral vascular diseases accounted for 29.63% of cases, dominated by coronary heart disease (23.49%), hypertension (5.53%), peripheral artery disease (0.52%), and stroke (0.09%). Arrhythmias were identified in 0.33% of patients.

Table 2. Distribution of Cardiac Diseases

Type of Heart Disease	Frequency (N=2116)	Percentage (%)
Coronary and Peripheral Vascular Disease	**627**	**29.63**
Hypertensive Disease	117	5.53
PAD	11	0.52
CAD	497	23.49
Stroke	2	0.09
Disorders of Rhythm		
Arrhythmia	7	0.33
Disorders of the Heart	**1482**	**70.04**
Heart Failure	1396	65.97
Valvular Heart Disease	18	0.85
Cardiomyopathy	58	2.74
Rheumatic Heart Disease	10	0.47

Note: PAD = Peripheral Artery Disease; CAD = coronary artery disease.

Comorbidities were present in 85% of patients, with hypertension (35%), diabetes mellitus (18%), dyslipidemia (15%), obesity (10%), and chronic kidney disease (7%) being the most common (**Table 3**).

Table 3. Patient Comorbidity Profile

Comorbidities	Frequency (N=2116)	Percentage (%)
No comorbidities	**318**	**15**
Presence of comorbidities	**1798**	**85**
- Hypertension	740	35
- Diabetes Mellitus	381	18
- Dyslipidemia	317	15
- Obesity	212	10
- Chronic Kidney Disease	148	7

4. DISCUSSIONS

The findings of this study align with research on the incidence of cardiovascular disease (CVD) in the United Kingdom, which indicates a higher prevalence of CVD among men. A study by Holthuis et al. (2021)[8] in the Netherlands reported that men aged <60 years with overweight, smoking habits, hypertension, and dyslipidemia had a 3.46–3.71-fold higher risk of developing cardiovascular disease. Similarly, research by

Wahabi et al. (2023)[9] in Saudi Arabia, Zainel et al. (2020)[10] in Qatar, Ma et al. (2024)[11] covering China, Laos, and Cambodia, and Cissé et al. (2022)[12] in Burkina Faso demonstrated that advancing age and male gender are associated with an accumulation of cardiovascular risk factors. In Indonesia, a study by Muharram et al.[13] also indicated an increase in the number of individuals with cardiovascular risk factors over the last 30 years, alongside a higher increase in obesity risk factors among men compared to women.[12] Furthermore, research by Tambunan et al. (2019)[14] showed that the Batak ethnic group exhibits an increased risk factor profile for cardiovascular disease.[13] This trend may be attributed to shifts in lifestyle, dietary habits, social norms, and increased tobacco use, particularly among men.

In this study, the majority of cardiovascular patients fell within the 51–60 age range, with a mean age of 56.27 years. This finding aligns with the natural epidemiological progression of cardiovascular risk factors, which tend to culminate in symptomatic disease during the fifth and sixth decades of life.[15,16] The cumulative burden of long-standing comorbidities, particularly hypertension (which affected 35% of our cohort) and diabetes mellitus (18%), significantly accelerates structural and functional cardiac decline.[15]

Heart failure was the most predominant primary diagnosis (65.97%) in our study. This high prevalence is consistent with the global trajectory of aging populations and the downstream consequences of poorly controlled cardiometabolic risk factors.[17] Chronic, unmanaged hypertension and late-stage coronary artery disease—both highly prevalent in this study—are established primary drivers of left ventricular remodeling and subsequent heart failure in older adults.[17–20] The high reliance on conservative, non-surgical management (91.7%) at this regional hospital underscores the critical need for early primary care intervention and aggressive risk factor modification before patients progress to advanced heart failure.

Global efforts in the prevention, management, and monitoring of cardiovascular disease must be sustained to reduce incidence, morbidity, and mortality rates. The results of this study may serve as a foundation for future research and a basis for formulating public health strategies or policies in Indonesia, particularly in the North Sumatra region.

This study has several limitations that must be acknowledged. First, the retrospective, cross-sectional design relying on medical records restricts the ability to establish temporal or causal relationships between demographic factors and cardiovascular outcomes. Second, as a single-center study conducted at Rantauprapat Hospital, the findings may not be fully generalizable to the broader population of North Sumatra or Indonesia. Third, the reliance on medical records introduces the potential for information bias, misclassification, or missing data regarding specific clinical parameters, such as echocardiographic findings (e.g., ejection fraction), detailed lipid profiles, and patient medication adherence, which were not thoroughly evaluated. Future multicenter, prospective studies incorporating detailed clinical and laboratory variables are needed to validate these findings.

5. CONCLUSION

In conclusion, heart failure (65.97%) and coronary artery disease (23.49%) were the most prevalent primary cardiovascular diagnoses among patients at the Rantauprapat Hospital cardiology clinic, predominantly affecting males within the 51–60 age demographic. Furthermore, hypertension was identified as the most common concurrent comorbidity, affecting 35% of the study population. These findings highlight a substantial burden of advanced cardiovascular disease driven by chronic comorbidities in older adults within this region. This underscores the critical need for enhanced primary healthcare interventions, aggressive risk factor modification, and targeted cardiovascular screening programs to prevent disease progression.

ACKNOWLEDGMENTS

None

REFERENCES

1. Palaniappan LP, Allen NB, Almarzooq ZI, et al. 2026 Heart Disease and Stroke Statistics: A Report of US and Global Data From the American Heart Association. *Circulation* 2026; CIR.0000000000001412.

2. Martin SS, Aday AW, Almarzooq ZI, et al. 2024 Heart Disease and Stroke Statistics: A Report of US and Global Data From the American Heart Association. *Circulation*; 149. Epub ahead of print 20 February 2024. DOI: 10.1161/CIR.0000000000001209.

3. Ralapanawa U, Sivakanesan R. Epidemiology and the Magnitude of Coronary Artery Disease and Acute Coronary Syndrome: A Narrative Review. *J Epidemiol Glob Health* 2021; 11: 169–177.

4. Afandy JE, Taslim. Challenges in Managing Myocardial Stunning Following Cardiac Arrest in a Very High-Risk NSTE-ACS Patient: A Case Report. *Nusant Med Sci J* 2025; 10: 1–7.

5. Goh RSJ, Chong B, Jayabaskaran J, et al. The burden of cardiovascular disease in Asia from 2025 to 2050: a forecast analysis for East Asia, South Asia, South-East Asia, Central Asia, and high-income Asia Pacific regions. *Lancet Reg Health West Pac* 2024; 49: 101138.

6. Joseph P, Lanas F, Roth G, et al. Cardiovascular disease in the Americas: the epidemiology of cardiovascular disease and its risk factors. *Lancet Reg Health - Am* 2025; 42: 100960.

7. Anggelina B, Kristina SA, Wiedyaningsih C. Knowledge of Cardiovascular Disease and its Association Among General Population in Indonesia. *J Manaj DAN PELAYANAN Farm J Manag Pharm Pract* 2023; 12: 234.

8. Holthuis EI, Visseren FLJ, Bots ML, et al. Risk Factor Clusters and Cardiovascular Disease in High-Risk Patients: The UCC-SMART Study. *Glob Heart* 2021; 16: 85.

9. Wahabi H, Esmaeil S, Zeidan R, et al. Age and Gender-Specific Pattern of Cardiovascular Disease Risk Factors in Saudi Arabia: A Subgroup Analysis from the Heart Health Promotion Study. *Healthcare* 2023; 11: 1737.

10. Zainel A. Risk Factors Associated with Cardiovascular Diseases among Adults Attending the Primary Health Care Centers in Qatar, a Cross-Sectional Study. Epub ahead of print 11 November 2020. DOI: 10.29011/2577-2228/100071.

11. Ma M, He L, Wang H, et al. Prevalence and Clustering of Cardiovascular Disease Risk Factors among Adults Along the Lancang-Mekong River: A Cross-Sectional Study from Low- and Middle-Income Countries. *Glob Heart* 2024; 19: 35.

12. Cissé K, Samadoulougou S, Coppieters Y, et al. First Report on the Co-Occurrence and Clustering Profiles of Cardiovascular Lifestyle Risk Factors among Adults in Burkina Faso. *Int J Environ Res Public Health* 2022; 19: 8225.

13. Muharram FR, Multazam CECZ, Mustofa A, et al. The 30 Years of Shifting in The Indonesian Cardiovascular Burden-Analysis of The Global Burden of Disease Study. *J Epidemiol Glob Health* 2024; 14: 193–212.

14. Tambunan LPS, Sjahrir H, Arina CA. The Difference of Stroke Risk Factor between Bataknese and Non-Bataknese at H. Adam Malik General Hospital Medan. *Indones J Med* 2019; 4: 122–134.

15. Conrad N, Molenberghs G, Verbeke G, et al. Trends in cardiovascular disease incidence among 22 million people in the UK over 20 years: population based study. *BMJ* 2024; 385: e078523.

16. Antza C, Gallo A, Boutari C, et al. Prevention of cardiovascular disease in young adults: Focus on gender differences. A collaborative review from the EAS Young Fellows. *Atherosclerosis* 2023; 384: 117272.

17. Domengé O, Fayol A, Ladouceur M, et al. Trends in prevalence of major etiologies leading to heart failure in young patients: An integrative review. *Trends Cardiovasc Med* 2024; 34: 80–88.

18. Anh DT, Minh HV, Binh HA, et al. Age Related Differences in Acute Coronary Syndrome: an Observation at a Central Hospital in Vietnam. *J Transl Intern Med* 2021; 9: 32–37.

19. Jain V, Minhas AMK, Morris AA, et al. Demographic and Regional Trends of Heart Failure-Related Mortality in Young Adults in the US, 1999-2019. *JAMA Cardiol* 2022; 7: 900–904.

20. Zaheen M, Pender P, Dang QM, et al. Myocardial Infarction in the Young: Aetiology, Emerging Risk Factors, and the Role of Novel Biomarkers. *J Cardiovasc Dev Dis* 2025; 12: 148.

Conflict of Interest Statement:

The author declares that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.