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The Prevelance of Heart Disease at Rantau Prapat Hospital, North Sumatra

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A B S T R A C T

Cardiovascular disease remains one of the leading causes of death worldwide, with approximately 58% of total deaths occurring in Asia. The majority of deaths are caused by ischemic heart disease (CHD) 47% or stroke 40%. The mortality rate from cardiovascular disease is projected to icrease by 91,2% by 2050 with high systolic blood preassure being the main risk factor. A descriptive cross-sectional study was conducted using medical record data of patients who visited the cardiology outpatient clinic at Rantau Prapat Regional Hospital North Sumatra between January 1 to December 31, 2023. Data collected included patient age, sex, and diagnosis. Univariate analysis was performed to describe the frequency distribution of demographic and clinical variables. A total of 2116 met the inclution criteria. The majority presented cardiac organ disorders 70.04%, followed by coronary and peripheral vascular diseases 29.63%.

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INTRODUCTION

Despite significant advances in the development and availability of effective and safe preventive strategies worldwide, cardiovascular disease (CVD) remains the leading cause of global mortality and morbidity. Approximately 58% of CVD related deaths occur in Asia. Nearly 39% of premature deaths defined as deaths in individuals aged < 70 years) are attributed to cardiovascular diseases, in the United States CVD accounts for 23% of total deaths, while globally it contributes to approximately 34% primarily due to ischemic heart disease (IHD) at 47% and stroke at 40%. According to the 2024 report by the American Heart Association (AHA) about 48,6 % of American aged over 20 years are affected by cardiovascular diseases, particulary Coronary Heart Disease (CHD), heart failure, stroke, or hypertension.1 Similarly a study conducted by Ralapanawa in 2021 in Sri Lanka revealed that CAD remains one of the major causes of death worldwide. Asia as the most populous region with diverse ethnicities, cultures, socioeconomic conditions and extensive healthcare systems faces substantial challenges in the prevention and management of cardiovascular diseases. Goh et al. (2024) is predicted 91,2% increase in CVD related mortality across Asia by 2050. In Southeast Asia stroke is expected to become the leading contributor to mortality by 2050 followed by Ischemic Heart Disease (IHD) with an estimated 112 deaths per 100.000 population and Hypertensive Heart Disease (HHD) with 19 deaths per 100.000 population.

Modifable risk factors contributing to cardiovascular disease comprise unhealty dietary habits, smoking, obesity, hypertension, dyslipidemia and diabetes mellitus. Hypertension represents the largest contributing risk factor accounting for approximately 22% of cardiovascular disease cases, followed by elevated non-HDL cholesterol level 8%, smoking 6%, central obesity 5% and diabetes mellitus 5%. In Indonesia non-communicable diseases (NCDs) are responsible for approximately 71% of all deaths. Among the population aged 30-70 years, the leading causes of mortality are cerecbrovascular disease 20,7%, ischemic heart disease 14,9% and diabetes mellitus 9,6%. Data from the 2008 Riset Kesehatan Dasar (Riskesdas) reported that the prevalence of heart disease was 1,5% with a slightly higher rate observed among urban populations 1,6% compared to rural populations 1,3%. Currently epidemiological data of heart disease in Indonesia are still limited, therefore this study is expected to serve as a valuable reference for future academic research.

LITERATURE REVIEW

Cardiovascular Disease (CVD)

Cardiovascular disease (CVD) remains the leading cause of mortality and morbidity globally despite major advances in prevention and treatment. Recent syntheses highlight that a substantial share of CVD deaths occur in Asia, driven mainly by ischemic heart disease and stroke, and forecasts suggest that CVD-related mortality in Asian regions may rise markedly toward 2050 as populations age and cardiometabolic risk factors accumulate.

A consistent theme in the contemporary literature is the dominance of modifiable risk factors in shaping CVD incidence and outcomes. Across populations, hypertension is repeatedly identified as the largest single contributor to CVD burden, followed by dyslipidemia, smoking, central obesity, and diabetes mellitus. The interaction of these risks with changing dietary patterns, physical inactivity, and urbanization is frequently cited as a key mechanism behind the growing CVD burden in many Asian countries.

Within Indonesia, non-communicable diseases account for the majority of deaths, and national-level reporting has long indicated that ischemic heart disease, cerebrovascular disease, and diabetes are major contributors to premature mortality. However, epidemiological data describing clinic- or hospital-level patterns of heart disease are still relatively limited and unevenly distributed across regions. This scarcity of granular, local evidence constrains the ability to tailor prevention and service planning to the risk profile and case mix of specific provinces and hospitals.

The more recent clinical-epidemiological literature also underscores changing age patterns in cardiovascular conditions. While CVD prevalence increases with age, several studies report persistent or increasing incidence of coronary disease and myocardial infarction among adults under 60, plausibly linked to rising obesity, diabetes, hypertension, and sedentary lifestyles. In parallel, heart failure is increasingly framed as a downstream endpoint of cumulative cardiometabolic exposure, with evidence suggesting a growing proportion of younger patients presenting with heart failure due to earlier onset of risk factors and, in some cases, cardiomyopathy-related etiologies.

Given these trends, hospital-based prevalence profiling remains important as a pragmatic approach to describe the distribution of cardiovascular diagnoses and comorbidities in real-world service settings. By documenting the most frequent cardiac diagnoses and accompanying comorbidities among cardiology outpatients in North Sumatra, this study contributes locally relevant baseline evidence that can inform prioritization of prevention (notably blood pressure control), outpatient management pathways, and future analytic research designs that move beyond description toward determinants and outcomes.

METHODOLOGY

This study employed a descriptive design with a cross-sectional approach. Data were obtained from the medical records of patients who visited the cardiology outpatient clinic at Rantau Prapat General Hospital North Sumatra during the period from January 1 to December 31, 2023. The inclusion criteria were patients who attended the cardiology outpatient clinic within the same period. The medical records contained complete information regarding patient's age, sex, and diagnose. The sampling technique used was consecutive-sampling. Data were analyzed using univariate analysis and all results were presented in frequency distributions to describe the clinical and epidemiological characteristics of the patients.

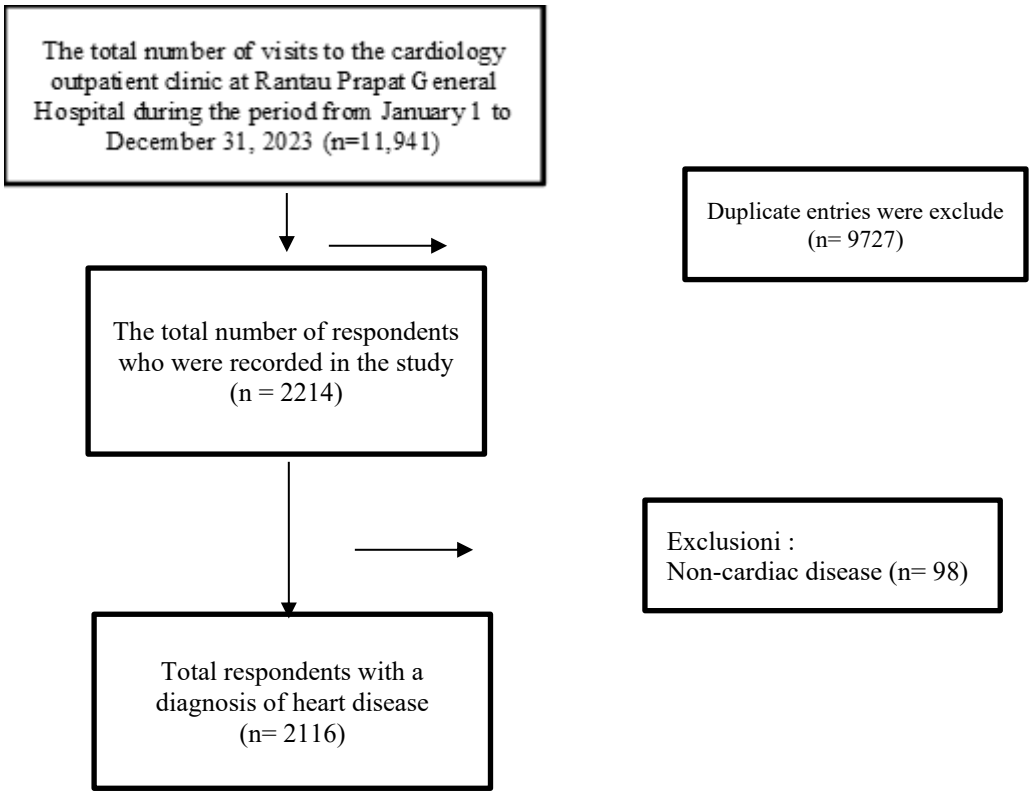

Figure 1. Data collection flowchart

RESEARCH RESULT

The study was conducted at Rantau Prapat General Hospital, North Sumatra, over a period of one year from January to December 2023. A total sample of 11.941 patients was initially identified in the hospital's electronic medical record system. After data cleaning and screening based on the inclusion and exclusion criteria 2.116 patients met the eligibility criteria. The variables collected in this study included age, sex and diagnosis of heart disease, as well as the type of cardiac disease.

The results of the study are presented in Table 1 below:

Table 1. Characteristics of Respondents Including Sex, Age, Socioeconomic Status and Occupation

Demographic Chararacteristics	Category	Frequency (N=2116)	Percentage (%)
Sex	Male	1115	52.69
	Female	1001	47.31
Age	Mean (Years)	56.27 ± 12,51682	
	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
Etnic	Batak	635	39
	Minangkabau	529	25
	Javanese	571	27
	Malay	381	18
Sosioeconomic status	Low	1059	50
	Middle	740	35
	High	317	15
Referral status	Referred	198	9.3
	Surgical (operative)	4	
	Non-surgical (Conservative and others)	194	
	Non-referral	1922	91.7

Based on the results presented in Table 1 total of 2.116 medical records were extracted from patients visiting the cardiology outpatient clinic at Rantau Prapat General Hospital, North Sumatra during the period of January 1 to December 21, 2023. Of these 1.115 patients 52.69% were male and 1.001 patients 47.31% were female with a mean patient age of 56 years. The largest age group was 51-60 years with total 701 patients 33.13% and the lowest age group was 0-9 years with total 9 patients 0.43%.

The largest ethnic group was Batak, consisting of 635 patients 39%, followed by Javanese with 571 patients 27%, Minangkabau 529 patients 25% and Malay with 381 patients 18%. Regarding socioeconomic status 1.059 patients 50% were categorized as low socioeconomic status, 740 patients 35% as middle socioeconomic status and 317 patients 15% as high socioeconomic status. Only a small proportion of patients required referral to a higher-level hospital was 194 patients 9.3% and 1922 patients 91.7% did not require referral.

Tablel 2. Characteristics of heart disease in the cardiology outpatient clinic at Rantau Prapat General Hospital

Types of heart disease	Diagnosis	Frequency (N=2116)	Percentage (%)
Coronary and Peripheral Vascular Disease		627	29.63
	Hypertensive Disease	117	5.53
	PAD	11	0.52
	IHD	497	23.49
	Stroke	2	0.09
Disorders of rhythm	Arrhytmia	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

The results of Table 2 show that among 2116 patients visiting the cardiology outpatient clinic at Rantau Prapat General Hospital, the most common type of heart disease was disorders of the heart found in 1482 patients 70.04 %. The majority of these cases were diagnosed as heart failure affecting 1396 patients 65.97%, followed by cardiomyopathy in 58 patients 2.74%, valvular heart disease in 18 patients 0.85% and rheumatic heart disease in 10 patients 0.47%. The second most common category was coronary and peripheral vascular disease observed in 627 patients 29.63%, predominantly due to Coronary Artery Disease (CAD) with 497 patients 23.49% followed by hypertension in 117 patients 5.53%, Peripheral Arterial Disease (PAD) in 11 patients 0.52% and stroke in 2 patients 0.09%.

Table 3. Characteristics of Comorbidities Among Patients in the Cardiology Outpatient Clinic in Rantau Prapat General Hospital North Sumatra

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

Table 3 shows that the majority of patients with heart disease had comorbidities totaling 1798 patients 85%. The most common comorbidities were hypertension 35%, diabetes mellitus 18%, dyslipidemia 15%, obesity 10% and chronic kidney disease 7%. Meanwhile 318 patients 15% had no comorbidities.

DISCUSSION

The results of this study are consistent with previous research on the incidence of cardiovascular disease carried out in the United Kingdom, which reported that men are more likely to experience cardiovascular disease. 6 As study by Holthuis et al. (2001) in the Netherlands reported that men aged <60 years who were overweight, smoker or had hypertension and dyslipidemia had a 3.46-3.71 times higher risk of developing cardiovascular disease.7 Similiarly Wahabi et al. (2023) in Saudi Arabia, Zainel et al. (2020) in Qatar, Ma et al (2024) in China, Laos and Cambodia, and Cissé et al. (2022) in Burkina Faso demonstrated that the increasing incidence of cardiovascular disease is associated with gender, in which men tend to have more cardiovascular risk factors. Research conducted in Indonesia also showed that the increasing number of individuals with cardiovascular risk factors. Muharram et al. reported that in Indonesia the number of individuals with obesity as a cardiovascular risk factor continues to rise and this condition is more prevalent among men compared to women. Tambunan et al. (2019) further demonstrated that the Batak etnic group has increasing cardiovascular risk factors. This trend is attributed to lifestyle, diet, cultural norms and higher levels tobacco and alcohol consumption, particularly among men.

The results of this study showed that the majority of cardiovascular disease patients were within the age range of 51-60 years, with a mean age of 56 years. This finding is consistent with a review by Antza et al. (2023) on atherosclerotic cardiovascular disease risk factor, which reported that in young adults there is an increasing trend recurrent Atherosclerotic Cardiovascular Disease (ASCVD) determinants such as obesity, hyperglicemia, substance abuse, active smoking, inflammatory disease and Diabetes Melitus. Conrad et al. (2024) in the United Kingdom observed that although the incidence of coronary heart disease has decreased in adults aged >60 years, rates among younger adults <60 years have remained unchanged for the last two decades. Similar patterns have been documented in other high-income countries, suggesting that increasing physical inactivity, obesity, and diabetes type 2 may contribute to the persistent incidence of coronary heart disease in younger populations.

The prevalence of heart failure increases with age and with the growing burden of risk factors. The lifetime risk of heart failure is estimated to be around 26% and approximately 40% occurring among adults aged 45 years. Despite heart failure being more common in older adults, recent data indicate a growing proportion of younger patients being diagnosed. This changed may be attributed to the rising prevalence of cardiometabolic risk factors, which begin to develop during early adulthood. Idiopathic Dilated Cardiomyopathy (IDC) is the most common cause of heart failure in individuals under 40 years old, followed by ischemic heart failure. The increasing global prealence of ischemic heart failure among younger adults may be attributed to the progressive changes in cardiovascular risk factors. The global rise in obesity and sedentary lifestyle, particulary among young and very young adults has led to an icrease in premature hypertension, diabetes, and the risk of early myocardial infarction which may subsequently progress to heart failure before the age of 50.

The incidence of acute myocardial infarction (AMI) among younger patients has shown a progressive increase over time. Premature coronary artery disease (CAD) is strongly associated with a higher risk of reccurent ischemic events, elevated mortality rates and a substantial impact on public health. Patients with premature coronary artery disease (CAD) typically present plaques characterized by a higher fibrotic content and fewer necrotic or calcified components, yet these palques are more prone to rupture and thrombus formation, reflecting increased plaque instability. In addition, young males generally exhibit a large plaque volume whereas yong females tend to have thicker fibrous caps and lower degrees of calcification, likely due to the stabilizing influence of estrogen on the fibrous layer. A study by Anh et al. (2021) in Vietnam revealed that young patients particularly those aged below 40 years with coronary heart disease were predominatly male, smokers and had family history. They also presented with more severe angina and ST-elevation myocardial infarction (STEMI). These findings indicate that genetic predisposition may contribute substantially to the occurrence of coronary heart disease in younger populations.

Preventive, management and monitoring efforts for cardiovascular diseases must be continuously strengthened at the global level to reduce incidence, morbidity and mortality rates. The findings of this study may serve as a foundation for future research and as a foundation for future research and as a basic for developing public health strategies in Indonesia, particularly in the North Sumatra.

CONCLUSIONS AND RECOMMENDATIONS

Heart failure 65.9% was identified as the most prevalent cardiovascular condition among patients visiting the cardiology outpatient clinic at Rantau Prapat General Hospital, followed by coronary artery disease (CAD) 23.49 % dan memiliki hipertensi (35%). Sebagian besar pasien berjenis kelamin laki-laki (52.69 %) dengan rentang usia 51-60 tahun (33.13 %).

ADVANCED RESEARCH

This study used a descriptive cross-sectional design based on electronic medical record data from a single cardiology outpatient clinic over a one-year period (January–December 2023), with analysis limited to univariate frequency distributions. As a result, the findings are best interpreted as a service-based prevalence profile rather than population prevalence; they may reflect referral patterns, case-mix, and diagnostic practices specific to Rantau Prapat General Hospital rather than the broader community burden of cardiovascular disease in North Sumatra.

A key limitation is the constrained variable set available for analysis. The dataset was restricted to age, sex, and primary diagnosis recorded in medical records. This limits the ability to examine clinically important determinants (e.g., blood pressure levels, lipid profile, glycemic status, BMI/central obesity, smoking, medication history, echocardiographic parameters, renal function) that are widely recognized as shaping cardiovascular risk and outcomes. In addition, although hypertension is reported as a prevalent comorbidity, the current design

does not enable robust characterization of comorbidity clusters or the severity and control of these risks.

The reliance on routine medical records introduces potential information bias. Diagnostic coding and documentation quality may vary across clinicians and across time, and misclassification can occur, particularly for syndromic diagnoses such as heart failure that may require standardized criteria and supporting investigations. While the study describes duplicate entry exclusion and eligibility screening, residual data quality issues (missingness, inconsistent terminology, repeat visits for the same patient, or incomplete comorbidity recording) may still influence the observed proportions of diagnoses.

Future research can strengthen inference and policy utility in several ways. First, multi-center studies across hospitals in different districts (including primary and secondary care) would improve generalizability and allow benchmarking of diagnostic patterns across service levels. Second, analytic designs should move beyond description by incorporating multivariable models to test associations between demographic and cardiometabolic risks and major outcomes (e.g., heart failure versus coronary artery disease case probability, admission, rehospitalization, mortality). This would require expanding data capture beyond age/sex/diagnosis to include standardized clinical and laboratory parameters.

Third, longitudinal cohort or registry approaches would address the inherent limitation of cross-sectional snapshots by tracking incidence, progression, treatment pathways, and outcomes over time. Such designs are particularly important given the study's finding that heart failure dominates the outpatient case mix, because heart failure outcomes are strongly influenced by medication optimization, adherence, comorbidity management, and follow-up continuity factors that cannot be evaluated with the current approach. Finally, integrating hospital data with community surveys or regional health surveillance would help reconcile clinic-based patterns with population-level prevalence, enabling more targeted prevention strategies and resource planning in North Sumatra.

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