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Inpatient therapy profile for coronary heart disease patients at Universitas Indonesia Hospital

Profil Terapi Pasien Rawat Inap Penyakit Jantung Koroner di Rumah Sakit Universitas Indonesia

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ABSTRACT

Background: *Coronary heart disease (CHD) was the second-highest cause of death in Indonesia. West Java is one of the provinces with a high prevalence of heart disease in Indonesia.*
Objective: *This study aimed to determine the inpatient therapy profile for CHD patients at Universitas Indonesia Hospital (RSUI).*
Methods: *This study was a descriptive study using data from medical records of inpatients with CHD who were registered as BPJS Kesehatan participants at RSUI from January to September 2024.*
Results: *The results showed that 84 patients met the inclusion and exclusion criteria from a total study population of 208 patients, with the majority of patients being male (59,5%), aged <60 years (56,0%), and having a primary complaint of chest pain (79,8%). Based on laboratory characteristics, most patients had normal troponin T levels (86,9%), normal blood creatinine levels (54,8%), and random blood glucose levels <200 mg/dL (77,4%). The length of hospitalization was ≤5 days (82,1%) with improved clinical outcomes (97,6%). Most patients had ≥3 comorbidities (53,6%), with the most common comorbidities being HHD (38,1%), hypertension (35,7%), and CHF (33,3%). In addition, most patients received ≥5 drugs (97,6%), with the commonly used therapeutic profiles being platelet aggregation inhibitors (79,8%), HMG CoA reductase inhibitors (78,6%), organic nitrates (67,9%), selective beta-blocking agents (56,0%), and ACE inhibitors (45,2%).*
Conclusion: *The predominant therapeutic profile of CHD inpatients at RSUI included platelet aggregation inhibitors, HMG CoA reductase inhibitors, organic nitrates, selective beta-blocking agents, and ACE inhibitors.*

Keywords: *coronary heart disease, inpatient, therapy profile*

ABSTRAK

Latar Belakang: Penyakit jantung koroner (PJK) merupakan penyebab kematian tertinggi kedua di Indonesia. Jawa Barat merupakan salah satu provinsi dengan prevalensi penyakit jantung tinggi di Indonesia.
Tujuan: Penelitian ini bertujuan untuk mengetahui profil terapi pasien rawat inap PJK di Rumah Sakit Universitas Indonesia (RSUI).
Metode: Penelitian ini merupakan penelitian deskriptif dengan menggunakan data dari rekam medis pasien rawat inap PJK yang terdaftar sebagai peserta BPJS Kesehatan di RSUI periode Januari-September 2024.
Hasil: Hasil penelitian menunjukkan bahwa sampel yang memenuhi kriteria inklusi dan eksklusi sebanyak 84 pasien dari total populasi penelitian yaitu 208 pasien, dengan pasien terbanyak berjenis kelamin laki-laki (59,5%), berusia <60 tahun (56,0%), dan memiliki keluhan utama nyeri dada (79,8%). Berdasarkan karakteristik hasil

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laboratorium, sebagian besar pasien memiliki kadar troponin T normal (86,9%), kadar kreatinin darah normal (54,8%), dan glukosa sewaktu <200 mg/dL (77,4%). Lama rawat inap pasien adalah ≤5 hari (82,1%) dengan luaran klinis perbaikan (97,6%). Sebagian besar pasien memiliki ≥3 penyakit penyerta (53,6%), dengan penyakit penyerta terbanyak adalah HHD (38,1%), hipertensi (35,7%), dan CHF (33,3%). Selain itu, sebagian besar pasien menerima ≥5 obat (97,6%), dengan profil terapi yang paling banyak digunakan adalah penghambat agregasi platelet (79,8%), HMG CoA reductase inhibitor (78,6%), nitrat organik (67,9%), agen penyekat beta selektif (56,0%), dan ACEI (45,2%).

Kesimpulan: Profil terapi pasien rawat inap PJK di RSUI didominasi oleh penghambat agregasi platelet, HMG CoA reductase inhibitor, nitrat organik, agen penyekat beta selektif, dan ACEI.

Kata kunci: penyakit jantung koroner, profil terapi, rawat inap

INTRODUCTION

Cardiovascular disease (CVD) is a category of diseases involving disorders of the heart and blood vessels. CVD is the leading cause of death worldwide, with an estimated 17.9 million deaths annually. CVD includes coronary heart disease (CHD), rheumatic heart disease, cerebrovascular disease, and other conditions [1]. CHD is a CVD that is the main cause of death in the world [2], [3].

Based on data from the Institute for Health Metrics and Evaluation (IHME), CHD was the second leading cause of death in Indonesia in 2021 [4]. Data from the 2023 Indonesian Health Survey shows that the prevalence of heart disease in Indonesia, including CHD, heart failure, arrhythmia, and congenital heart disease, is 0.85%. The highest prevalence is found in the Special Region of Yogyakarta (1.67%), Central Papua (1.65%), Jakarta (1.56%), West Java (1.18%), and East Kalimantan (1.08%) [5].

In general, CHD patients receive various combinations of drug therapies, such as anti-ischemic, antiplatelet, anticoagulant, statin, and other therapies. Additionally, revascularization procedures such as percutaneous coronary intervention (PCI) or coronary artery bypass grafting (CABG) can also be performed on CHD patients. The primary goals of therapy in CHD patients are to reduce symptoms, prevent recurrent myocardial ischemia, and prevent disease progression and complications [6].

The results of research at hospitals in South Jakarta City, DKI Jakarta, showed that 75.6% of inpatients with CHD received five to seven drugs [7]. In addition, research results in Manado City, North Sulawesi, also reported that 57.9% of inpatients with CHD received five to 10 drugs, and 39.5% of inpatients with CHD received more than 10 drugs [8]. Research at hospitals in Tangerang Regency, Banten, showed that the most common types of therapy received by inpatients with CHD were antiplatelets (21.6%), HMG-CoA reductase inhibitors (12.8%), selective β-blockers (11.6%), ACE inhibitors (6.4%), and antianginals (6.2%) [9]. Research at a hospital in Madiun City, East Java, reported that the combination of drug therapy most commonly used by CHD patients was clopidogrel, bisoprolol, and simvastatin (18%) [10]. Based on the description, this study aims to determine the therapy profile of inpatients with CHD, especially in other provinces that have a high prevalence of heart disease, such as in West Java province, namely at the Universitas Indonesia Hospital (RSUI).

METHODS

Study design

This study was a descriptive study with retrospective data collection.

Data source and sampling procedure

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Data were collected from the medical records of inpatients with CHD at RSUI for the period January–September 2024. The study population consisted of all inpatients with CHD registered as BPJS Kesehatan participants at RSUI during this period. The sampling technique used was total sampling.

Variable of the study

The variables in this study included patient characteristics (age and gender), chief complaints, laboratory examination results, treatment data, comorbidities, length of hospitalization, and clinical outcomes.

Data collection

Data were obtained from the medical records of 208 patients from January to September 2024, of which 84 patients met the inclusion criteria. Inclusion criteria were patients aged ≥18 years and having complete medical record data, including age, gender, chief complaint, laboratory examination data, patient treatment data, comorbidities, length of hospitalization, and patient clinical outcomes. Exclusion criteria were patients who were discharged involuntarily or discharged at their own request.

Measurement and instrument

The instrument used in this study was the patient's medical records.

Ethical considerations

This research has received approval from the RSUI Research Ethics Committee with ethical approval number S-074/KETLIT/RSUI/III/2025.

Data analysis

Data were collected and analyzed descriptively to obtain frequency distributions and proportions of patient characteristics, comorbidities, and treatment profiles. Data analysis was performed using Microsoft Excel.

RESULTS

The sample size in this study was 84 patients, with an average age of 58.57 ± 10.862 years. Inpatients with CHD were predominantly male (59.5%), with an age range of <60 years (56.0%). The patient's main complaint was chest pain (79.8%). The majority of inpatients with CHD had normal troponin T levels (86.9%), normal blood creatinine (54.8%), and random glucose <200 mg/dL (77.4%). The most common comorbidities suffered by patients were ≥3 comorbidities (53.6%). The majority of CHD inpatients received therapy with ≥5 drugs (97.6%) and had a length of stay of ≤5 days (82.1%). Clinical outcomes of CHD inpatients consisted of improvement (97.6%) and death (2.4%). Data on the characteristics of CHD inpatients can be seen in Table 1.

Table 1. Characteristics of Inpatients with CHD at RSUI

Parameter	n	Percentage (%)
Gender		
Man	50	59.5
Woman	34	40.5
Age		
<60 years	47	56.0
≥60 years	37	44.0
Main Complaint		
Chest Pain	67	79.8
Hard to breathe	54	64.3
Heartburn	18	21.4
Troponin T*		
Normal	73	86.9
High	11	13.1

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Parameter	n	Percentage (%)
Blood Creatinine*		
Low	4	4.8
Normal	46	54.8
High	34	40.5
Random Glucose		
<200 mg/dL	65	77.4
≥200 mg/dL	19	22.6
Number of Therapy		
<5 drugs	2	2.4
≥5 drugs	82	97.6
Number of Comorbidities		
<3 comorbidities	39	46.4
≥3 comorbidities	45	53.6
Length of Hospitalization		
≤5 days	69	82.1
>5 days	15	17.9
Clinical Outcomes		
Improved, discharged	82	97.6
Death	2	2.4

Note: *Reference values refer to RSUI laboratory standards. The reference value for troponin T is <50 ng/L. The reference value for blood creatinine is 0.50-1.00 mg/dL for women and 0.70-1.20 mg/dL for men.

In this study, the most common comorbidity among patients was hypertensive heart disease (HHD) (38.1%). HHD is a heart condition with clinical or structural abnormalities caused by arterial hypertension [11]. The types of comorbidities in inpatients with CHD can be seen in Table 2.

Table 2. Top Ten Comorbid Conditions in Hospitalized Patients with Coronary Heart Disease at RSUI

Types of Comorbidities	n	Percentage (%)
HHD	32	38.1
Hypertension	30	35.7
CHF	28	33.3
Type 2 Diabetes Mellitus	25	29.8
Dyspepsia	16	19.0
Hypokalemia	13	15.5
Anemia	12	14.3
CKD	10	11.9
GERD	9	10.7
Pneumonia	9	10.7
AKI	7	8.3

Description: AKI (Acute Kidney Injury), CHF (Congestive Heart Failure), CKD (Chronic Kidney Disease), GERD (Gastroesophageal Reflux Disease), HHD (Hypertensive Heart Disease).

Platelet aggregation inhibitors (except heparin) (79.8%), HMG CoA reductase inhibitors (78.6%), and organic nitrate (67.9%), are the most dominant therapies used by inpatients with CHD. The therapy profile of inpatients with CHD can be seen in Table 3.

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Table 3. Therapy Profile of Inpatients with CHD at RSUI

ATC Code	Therapy Group	Examples of drugs	n	Percentage (%)
B01AC	Platelet aggregation inhibitors, except heparin	Acetylsalicylic acid, clopidogrel	67	79.8
C10AA	HMG CoA reductase inhibitor	Atorvastatin, rosuvastatin, simvastatin	66	78.6
C01DA	Organic nitrate	ISDN, nitroglycerin	57	67.9
C07AB	Beta-blocking agent, selective	Bisoprolol	47	56.0
C09AA	ACE inhibitors, plain	Captopril, ramipril	38	45.2
B01AX	Other antithrombotic agents	Fondaparinux	32	38.1
C08CA	Dihydropyridine derivatives	Amlodipine, nifedipine	25	29.8
B01AB	Heparin group	Heparin, enoxaparin	22	26.2
C09CA	ARB, plain	Candesartan, irbesartan	16	19.0
N01BB	Amida	Lidocaine	16	19.0
N02AA	Opium alkaloids	Morphine	7	8.3
C01EB	Other cardiac preparations	Trimetazidine	3	3.6
C08DB	Benzothiazepine derivatives	Diltiazem	2	2.4
C07AG	Alpha and beta blocking agents	Carvedilol	1	1.2

Description: ACE, angiotensin converting enzyme; ARB, angiotensin receptor blocker; ISDN, isosorbide dinitrate

DISCUSSION

The results of this study were similar to previous research conducted in Manado City, North Sulawesi, which showed that 76.3% of inpatients with CHD were male [8]. Based on data from the World Heart Report 2023, Indonesia is ranked fourth in the list of five countries with the highest smoking prevalence in men, namely 58.3% [12]. Smoking is one of the main risk factors for CHD [6].

Based on age characteristics, the majority of patients were aged <60 years (56.0%), while patients aged ≥60 years accounted for 44.0% of the total sample. The results of this study were similar to those in Tangerang Regency, Banten, which reported that 36.0% of inpatients with CHD were aged ≥60 years [13]. In addition, another study in Vietnam also showed that 46.0% of CHD patients were aged ≥65 years old [14].

In this study, most of the inpatients with CHD had a length of hospitalization of ≤5 days (82.1%). This is in accordance with the 2016 Clinical Practice Guidelines and Clinical Pathway (CP) for Cardiovascular Disease, which recommends that the uncomplicated care plan be 5 days. Furthermore, the results of this study align with other studies showing that 92.0% of inpatients with CHD had a length of stay of ≤5 days [13].

Based on the characteristics of the number of comorbidities, 53.6% of inpatients with CHD had ≥3 comorbidities. The most common comorbidities suffered by patients were HHD (38.1%), hypertension (35.7%), CHF (33.3%), type 2 diabetes mellitus (29.8%), and dyspepsia (19.0%). The results of this study differ from those of a study in Makassar City, South Sulawesi, which reported that dyslipidemia (83.3%), hypertension (74.6%), CHF (40.8%), and diabetes mellitus (30.8%) were the most common comorbidities found in CHD patients [15]. Differences in comorbidities suffered by patients can be influenced by their lifestyle. A healthy lifestyle has been reported to reduce multimorbidity in patients [16]. Several comorbidities, such as dyslipidemia, hypertension, and diabetes mellitus, are major risk factors for CHD. These conditions can cause endothelial damage and dysfunction, allowing LDL cholesterol and inflammatory cells to migrate from the plasma into the subendothelial space [6]. This can lead to the formation of foam cells and ultimately result in fatty streaks, known as precursors to atherosclerosis [17].

Based on patient therapy profiles, the five most commonly used therapies by inpatients with CHD are platelet aggregation inhibitors (except heparin) (79.8%), HMG

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CoA reductase inhibitors (78.6%), organic nitrates (67.9%), selective beta-blocking agents (56.0%), and ACE inhibitors (45.2%). The therapies used by these patients are in accordance with guidelines for the management of stable angina pectoris and acute coronary syndrome (ACS), which explain that drug therapy for CHD patients is antiplatelet, beta-blocking agents, nitrates, CCBs, ACE inhibitors or ARBs, anticoagulants, and statins [18], [19]. Stable angina pectoris and ACS are clinical manifestations of CHD [20]. The results of this study are in line with previous studies, which showed that platelet aggregation inhibitors (except heparin) and HMG CoA reductase inhibitors rank first as the most widely used therapies for CHD patients [9].

Platelets play a crucial role in the pathophysiology of ACS. Thromboxane A2 (TXA2) is a potent platelet activator. Acetylsalicylic acid inhibits cyclooxygenase, the enzyme responsible for TXA2 production, thereby inhibiting platelet activation and aggregation. In patients with stable or unstable angina, acetylsalicylic acid has been consistently shown to reduce the risk of myocardial infarction [6]. In this study, the platelet aggregation inhibitors (except heparin) used by the patients were acetylsalicylic acid and clopidogrel. In addition to monotherapy, dual antiplatelet therapy was also found in this study. Dual antiplatelet therapy with acetylsalicylic acid and a P2Y12 receptor inhibitor (clopidogrel, ticagrelor, prasugrel) can be recommended for patients hospitalized with ACS and/or PCI [6].

HMG CoA reductase inhibitor or statin therapy, besides having the main effect of lowering LDL cholesterol, it also provides additional benefits for CHD patients, namely, it can stabilize atherosclerotic plaque and contribute to reducing cardiovascular risk [6]. In this study, the statin therapies used by patients were atorvastatin, rosuvastatin, and simvastatin. For patients with CHD, the recommended statin therapy is medium- to high-intensity statin therapy [21], [22]. Atorvastatin doses of 10-20 mg, rosuvastatin doses of 5-10 mg, and simvastatin doses of 20-40 mg are considered intermediate-intensity statin therapy. Atorvastatin doses of 40-80 mg and rosuvastatin doses of 20-40 mg are considered high-intensity statin therapy [23]. In stable angina pectoris patients, intermediate-intensity statin therapy is indicated for patients aged ≥75 years or in patients who are intolerant to high-intensity statins. High-intensity statin therapy is indicated for stable angina pectoris patients aged <75 years [21]. In ACS patients, the recommended statin therapy is high-intensity statin therapy [22].

Short-acting nitrates are the first-line treatment for stopping acute anginal episodes. All patients with a history of angina are advised to have sublingual nitroglycerin tablets to relieve acute ischemic symptoms. Nitrates primarily cause venodilation, which leads to decreased preload. The resulting reduction in ventricular volume and wall tension leads to a decrease in myocardial oxygen demand. In higher doses, nitrates cause arterial dilation and reduce afterload and blood pressure [6]. In this study, the organic nitrates used by patients were nitroglycerin and ISDN. Organic nitrates were the third most commonly used therapy among inpatients with CHD. This may be due to the patient's primary complaint being chest pain.

In addition to organic nitrates, selective beta-blocking agents such as bisoprolol are also widely used by patients. Beta-blockers competitively inhibit the effects of catecholamines released and circulating through neurons on β-adrenoceptors. Blockade of β1 receptors in the heart and kidneys can reduce heart rate, contractility, and blood pressure. β1-selective agents are recommended for patients with chronic obstructive pulmonary disease (COPD), peripheral arterial disease (PAD), diabetes, dyslipidemia, and sexual dysfunction [24]. Based on a multicenter study conducted in 42 hospitals in China, South Korea, and Vietnam, it was shown that bisoprolol is effective in reducing

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resting heart rate and provides significant benefits in the clinical outcomes of CHD patients [25].

In this study, the use of ACE inhibitors (45.2%) was greater than that of ARBs (19.0%). ACE inhibitors and ARBs are therapies that work by inhibiting the renin-angiotensin-aldosterone system [6]. ACE inhibitors are reported to have greater benefits in reducing the risk of myocardial infarction. High levels of plasminogen activator inhibitor-1 (PAI-1) and decreased tissue plasminogen activator (t-PA) activity can affect blood flow in the coronary vessels, leading to CHD. The use of ACE inhibitors can increase bradykinin levels, which can stimulate the synthesis of t-PA and angiotensin-4 (AT4) receptors. This results in increased expression of PAI-1 secretion in endothelial cells [26]. ACE inhibitors are given to CHD patients with hypertension, diabetes, heart failure with reduced ejection fraction (HFrEF), or CKD, unless there are contraindications [24]. In addition to drug therapy, 15.5% of inpatients with CHD in this study also received PCI. PCI may be recommended for patients experiencing acute STEMI with onset less than 12 hours, high-risk acute non-STEMI, or CHD patients with significant coronary artery narrowing [11].

The strength of this study was its ability to provide an actual picture of the therapy patterns of inpatients with CHD at RSUI from January to September 2024. However, on the other hand, this study has several limitations: it is a retrospective, single-center study, and has a limited sample size. The use of retrospective data may limit information on the characteristics of CHD patients, while the single-centered nature and limited sample size influence the results, which may not be generalizable. Nevertheless, the results of this study have important implications for helping healthcare professionals understand the therapy patterns of CHD patients and can be used as a basis for selecting more effective and safe therapies.

CONCLUSIONS

The most commonly used therapeutic profiles for inpatients with CHD at RSUI are platelet aggregation inhibitors, HMG-CoA reductase inhibitors, organic nitrates, selective beta-blockers, and ACE inhibitors. Further research is recommended in a multicenter setting with a larger sample size to obtain a more comprehensive and generalizable therapeutic profile for patients with CHD. Furthermore, because this study only provides information regarding patient therapeutic profiles, further research is needed to identify drug-related problems (DRPs) and their impact on clinical outcomes in patients with CHD.

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