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Antiplatelet Use in Ischemic Stroke Inpatients: A Single-Centre Retrospective Study

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ABSTRACT

Stroke is an acute neurological condition caused by interruption of blood flow to the brain, spinal cord, or retina, leading to disability or death. Ischemic stroke is the most common type and is closely related to thrombosis or embolism in cerebral vessels. Antiplatelet agents are central to secondary prevention because they inhibit platelet aggregation and thrombus formation, thereby reducing the risk of recurrent stroke. This study aimed to describe the pattern of antiplatelet use among ischemic stroke inpatients at Dr. Saiful Anwar Malang Regional General Hospital. This was an observational, single-centre, retrospective descriptive study using medical records of ischemic stroke inpatients who received at least one antiplatelet regimen and had complete data between January and December 2024. Patients with incomplete records, without antiplatelet therapy during hospitalization, or with uncertain diagnoses were excluded. Data were analysed descriptively. Of 190 patients diagnosed with ischemic stroke, 124 met the eligibility criteria. Overall, 153 antiplatelet regimens were identified: 118 (77.1%) single-antiplatelet regimens and 35 (22.9%) dual-antiplatelet regimens. The most common single regimen was aspirin 160 mg once daily by mouth (70/118; 59.3%), followed by aspirin 160 mg once daily via nasogastric tube (24/118; 20.3%). The most frequent dual-antiplatelet regimen was aspirin 80 mg once daily by mouth plus clopidogrel 75 mg once daily by mouth (30/35; 85.7%). There were 17 regimen switches during hospitalization, most often from aspirin 160 mg once daily to aspirin 80 mg once daily (3/17; 17.6%), reflecting adjustment from the acute to the maintenance phase. In conclusion, single antiplatelet therapy, predominantly aspirin 160 mg once daily, was more commonly used than dual antiplatelet therapy among ischemic stroke inpatients in this hospital. These findings describe real-world prescribing patterns and may support evaluation of local protocols and future outcome-based studies.

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ABSTRAK

Stroke merupakan gangguan neurologis akut akibat terhentinya aliran darah ke otak, medula spinalis, atau retina yang dapat berujung pada kecacatan maupun kematian. Stroke iskemik merupakan tipe tersering dan erat kaitannya dengan kejadian trombosis atau emboli pada pembuluh darah serebral. Antiplatelet merupakan komponen utama pencegahan sekunder karena menghambat agregasi trombosit dan pembentukan trombus sehingga menurunkan risiko stroke berulang. Penelitian ini bertujuan mendeskripsikan pola penggunaan antiplatelet pada pasien stroke iskemik rawat inap di RSUD dr. Saiful Anwar Malang. Penelitian ini merupakan studi observasional deskriptif retrospektif di satu rumah sakit, menggunakan data rekam medis pasien rawat inap dengan diagnosis stroke iskemik yang menerima sedikitnya satu regimen antiplatelet dan memiliki data lengkap pada periode Januari–Desember 2024. Pasien dengan rekam medis tidak lengkap, tidak mendapatkan antiplatelet selama perawatan, atau dengan diagnosis tidak pasti dikeluarkan dari analisis. Data dianalisis secara deskriptif. Dari 190 pasien dengan diagnosis stroke iskemik, 124 memenuhi kriteria inklusi. Secara keseluruhan, teridentifikasi 153 regimen antiplatelet yang terdiri atas 118 (77,1%) regimen antiplatelet tunggal dan 35 (22,9%) regimen kombinasi dua antiplatelet. Regimen tunggal yang paling sering digunakan adalah aspirin 160 mg satu kali sehari per oral (70/118; 59,3%), diikuti aspirin 160 mg satu kali sehari melalui selang nasogastrik (24/118; 20,3%). Regimen kombinasi yang paling sering digunakan adalah aspirin 80 mg satu kali sehari per oral dikombinasikan dengan clopidogrel 75 mg satu kali sehari per oral (30/35; 85,7%). Terdapat 17 kejadian pergantian regimen selama perawatan, dengan pola tersering berupa penurunan dosis dari aspirin 160 mg satu kali sehari menjadi aspirin 80 mg satu kali sehari (3/17; 17,6%) yang mencerminkan transisi dari fase akut ke fase pemeliharaan. Dapat disimpulkan bahwa terapi antiplatelet tunggal, terutama aspirin 160 mg satu kali sehari, lebih dominan digunakan dibandingkan terapi kombinasi pada pasien stroke iskemik rawat inap di rumah sakit ini. Temuan ini menggambarkan pola peresepan di praktik klinik nyata dan dapat menjadi dasar evaluasi protokol lokal serta penelitian lanjutan berbasis luaran klinis.

Kata Kunci: Stroke iskemik; Antiplatelet; Aspirin; Clopidogrel; Terapi rawat inap

1. Introduction

Stroke is a medical condition characterised by the sudden onset of focal neurological deficits lasting at least 24 hours. These deficits are caused by infarction or tissue death due to the cessation of blood flow to a specific area of the brain, spinal cord, or retina. Ischemic stroke is a type of stroke that occurs due to cerebral artery blockage that reduces blood flow to the brain. The main causes include the formation of local thrombi or emboli from other parts of the body [1].

According to data from *the World Stroke Organization*, there were 11.9 million stroke incidents in the world. Globally, more than 65.3%of stroke cases are ischemic strokes [2]. In Indonesia, the 2018 National Health Survey recorded a stroke prevalence of 10.9‰, while in 2023 the prevalence decreased to 8.3‰. East Java is among the six provinces with the highest stroke prevalence, at 9.0‰ [3].

The management of ischemic stroke includes pre-hospital management, emergency room care, inpatient care in accordance with procedures, and the administration of medication. Medications used in the treatment of ischemic stroke include thrombolytics, antihypertensives, antiplatelets, and neuroprotectants [4].

The administration of antiplatelet drugs is a key component in the management of ischemic stroke to reduce the risk of recurrent stroke. Commonly used antiplatelet drugs include aspirin, dipyridamole, clopidogrel, and ticagrelor [5]. Antiplatelet drugs reduce platelet aggregation and inhibit thrombus formation to prevent acute and chronic thrombotic stent occlusion. These drugs are highly effective in arterial circulation. Antiplatelet agents are very useful for primary and secondary prevention of cerebrovascular or cardiovascular disease [6].

Similar studies indicate that the antiplatelet agents commonly used in patients with ischemic stroke at Dr. Moewardi General Hospital are acetylsalicylic acid (1x80 mg) orally (73%), clopidogrel (1x75 mg) (19%), and a combination of acetylsalicylic acid and clopidogrel (8%) [7]. Another study shows that the most commonly used antiplatelet agents are a combination of aspirin (1x80 mg) orally and clopidogrel (1x75 mg) orally [8]. Recent study shows the most dominant antiplatelet use were aspirin (40%) in stroke patients [9]. Therefore, this study aimed to describe the demographic characteristics, clinical profiles, and patterns of inpatient antiplatelet use—including agent, dosage, route of administration, treatment duration, and switching patterns—among patients with ischemic stroke treated at Dr. Saiful Anwar Malang Regional General Hospital during January–December 2024.

2. Method

Study Design and Setting

This study was an observational study with a retrospective descriptive design conducted at Dr. Saiful Anwar Malang Regional General Hospital, a tertiary referral hospital in East Java, Indonesia. The study period covered admissions from January to December 2024.

Eligibility Criteria

The study population comprised all adult inpatients with a diagnosis of ischemic stroke. Patients were included if they had a confirmed diagnosis of ischemic stroke, received at least one antiplatelet regimen during hospitalization, and had complete medical record data between January 2024 and December 2024. Patients were excluded if their medical records were incomplete, if they did not receive any antiplatelet therapy during hospitalization, or if the diagnosis of ischemic stroke was uncertain.

Sampling and Case Ascertainment

Sampling was conducted using a total consecutive sampling method, including all eligible ischemic stroke inpatients during the study period. Case verification was based on diagnoses recorded in the medical records and cross-checked against pharmacy logs to confirm antiplatelet use. Of 190 inpatients with an ischemic stroke diagnosis, 124 met the inclusion criteria, while 66 were excluded due to incomplete records and/or absence of antiplatelet therapy.

Data Sources and Variables

Data were obtained from patients' medical records (MRs) and pharmacy records using a standardized data collection form (DCF). The collected variables included demographic characteristics (age, sex, insurance status), clinical parameters (ischemic stroke classification, vascular risk factors, comorbidities), hospitalization data (length of stay, discharge status), and antiplatelet regimen details (agent, dose, route of administration, duration of therapy, and switching patterns).

Regimen Classification and Operational Definitions

Antiplatelet regimens were classified as single antiplatelet therapy (SAPT) or dual antiplatelet therapy (DAPT). Each distinct antiplatelet regimen used during hospitalization was counted as one treatment course, so a single patient could contribute more than one regimen if therapy was switched. Switching patterns were categorized according to changes in antiplatelet agent and/or dosage during hospitalization. Routes of administration were defined as by mouth (per os, PO) or via nasogastric tube (NGT).

Data Collection Procedures

Data were extracted from patients' MRs by the main researcher using the DCF. All entries were rechecked against the original medical records to minimize transcription errors. Any discrepancies or missing data identified during checking were resolved by re-examining the source documents.

Statistical Analysis

Data from the DCF were compiled into a master table and analyzed descriptively using Microsoft Excel. Categorical variables such as sex, stroke classification, vascular risk factors, and antiplatelet regimens were summarized as frequencies and percentages. Continuous variables such as age and length of stay were summarized as frequencies and percentages by category. Because patients could have more than one vascular risk factor, the total number of risk factors exceeded the number of patients; therefore, this was indicated with a footnote in the table.

Ethical Considerations

This study obtained ethical approval from the Ethics Committee of Dr. Saiful Anwar Malang Regional General Hospital (approval number 400/107/K.3/102.7/2025). Patient confidentiality was maintained by anonymizing all data prior to analysis.

3. Results and Discussion

Based on the retrospective review of ischemic stroke inpatients at Dr. Saiful Anwar Malang Regional General Hospital between January and December 2024, 190 patients were identified with a diagnosis of ischemic stroke. Of these, 124 patients received antiplatelet therapy and met the inclusion criteria. A total of 66 medical records were excluded because of incomplete documentation and/or absence of antiplatelet therapy.

Table 1 shows the demographic and clinical characteristics of ischemic stroke inpatients who received antiplatelet therapy. The majority of patients were male (73/124; 58.9%), while females accounted for 51/124 (41.1%). Men tend to experience stroke at a younger age than women, a pattern that is often linked to a higher prevalence of modifiable risk factors such as smoking, excessive alcohol consumption, and undiagnosed hypertension in middle-aged men [10]. In contrast, premenopausal women are partly protected by oestrogen, which exerts cardiovascular and neuroprotective effects; however, the risk increases after menopause, particularly in the presence of migraine, oral contraceptive use, or other prothrombotic conditions [11].

Table 1. Demographic and clinical characteristics of ischemic stroke inpatients receiving antiplatelet therapy (n = 124)

Characteristic	Category	n	% of 124 patients
Gender	Male	73	58.9
	Female	51	41.1
Age group (years)	25–34	1	0.8
	35–44	6	4.8
	45–54	24	19.4
	55–64	45	36.3
	65–74	32	25.8
	≥ 75	16	12.9
Classification of ischemic stroke	Thrombotic ischemic stroke	120	96.8
	Embolic ischemic stroke	4	3.2
Vascular risk factors*	Smoking	22	17.7
	Hypertension	94	75.8
	Dyslipidaemia	2	1.6
	Diabetes mellitus	35	28.2
	Heart disease	11	8.9
	No risk factors	15	12.1

*Note: *Patients may have more than one vascular risk factor; therefore, the total number of risk factors exceeds the number of patients.*

The highest proportion of ischemic stroke patients was in the 55–64-year age group (45/124; 36.3%), followed by the 65–74-year group (32/124; 25.8%). These findings are consistent with previous studies reporting that the 55–64-year age group accounts for the largest proportion of ischemic stroke cases, followed by older age groups [12]. Individuals aged 56–65 years are particularly vulnerable to stroke because of degenerative changes in cerebral blood vessels that promote atherosclerosis and reduce vascular elasticity. This process is often accompanied by systemic hypoperfusion due to cardiac arrhythmias and comorbid conditions that further increase stroke risk [12].

Most patients in this study experienced thrombotic ischemic stroke (120/124; 96.8%), while embolic stroke was less frequent (4/124; 3.2%). In general, approximately 75% of ischemic stroke cases are caused by atherosclerosis, which leads to direct blockage of the cerebral arteries (thrombotic stroke), while the remaining 25% are caused by embolism, namely blood clots originating from other locations in the systemic circulation that subsequently block the cerebral arteries [13]. Hypertension was the most common vascular risk factor (94/124; 75.8%), followed by diabetes mellitus (35/124; 28.2%), smoking (22/124; 17.7%), heart disease (11/124; 8.9%), and dyslipidaemia (2/124; 1.6%); 15 patients (12.1%) had no documented risk factors. Hypertension is a major trigger for both ischemic and haemorrhagic stroke because chronic elevation of blood pressure causes vascular remodelling, atherosclerotic plaque formation, and left ventricular hypertrophy, which together impair cerebral haemodynamics [14]. Diabetes mellitus accelerates atherosclerosis in both small and large vessels, including those supplying the brain, thereby increasing the risk of vascular occlusion or rupture [15].

In this study, both single and dual antiplatelet regimens were used in ischemic stroke inpatients, as shown in Table 2. Single antiplatelet therapy was more common (118/153 regimens; 77.1%) than dual antiplatelet therapy (35/153 regimens; 22.9%).

Table 2. Antiplatelet Therapy Patterns

Antiplatelet Therapy	Number of Therapies*	Percentage
Single Therapy	118	77
Combination Therapy 2	35	23
Total	153	100

*Note: *Patients may receive more than one treatment regimen*

Single antiplatelet therapy, particularly with aspirin, is recommended both in the acute phase and as a secondary prevention strategy in patients with ischaemic stroke. In the acute phase, single aspirin administration is recommended within the first 24–48 hours after the onset of ischaemic stroke, especially in patients with a NIHSS score >3. For patients who arrive more than 48 hours after the event, aspirin is still recommended as secondary therapy to prevent recurrence. Meanwhile, in patients with low-risk *transient ischaemic attacks (*TIAs*)*, single aspirin therapy may be administered [16]. Similar studies show that single antiplatelet therapy with acetylsalicylic acid can reduce the risk of stroke recurrence by approximately 60% within six weeks after the initial event. The greatest effectiveness is seen in patients with mild stroke, where secondary prevention is crucial to prevent disease progression [17].

Table 3. Single Antiplatelet Therapy

Single Therapy	n	%
ASA (1x160 mg) orally	70	59
ASA (1x160 mg) via NGT	24	20
Cilostazol (1x100 mg) orally	7	6
Clopidogrel (1x75 mg) orally	4	3
ASA (1x80 mg) orally	8	7
ASA (1x80 mg) via NGT	3	3
Cilostazol (1x100 mg) via NGT	1	1
Ticagrelor (1x90 mg) orally	1	1
Total	118	100

Note: ASA: Acetylsalicylic acid/Aspirin; NGT: nasogastric tube

Table 3 shows that the most commonly used single antiplatelet regimen in ischemic stroke inpatients was aspirin (ASA) 160 mg once daily by mouth, accounting for 70 of 118 single-antiplatelet regimens (59.3%), followed by ASA 160 mg once daily via NGT (24/118; 20.3%). In Indonesia, aspirin is widely used as the first-line antiplatelet agent for the prevention of ischemic stroke and acute coronary syndrome because it is readily available, affordable, and accessible across different levels of health care [18].

Based on the guidelines for the management of acute ischemic stroke, aspirin is recommended as initial therapy at a dose of 160 to 325 mg, which should be administered within 24 to 48 hours after the onset of symptoms [19]. Aspirin is the most commonly used antiplatelet agent due to its wide availability, affordability, and relatively good safety profile. Administration of aspirin within 48 hours after the onset of acute ischemic stroke has been shown to reduce the risk of recurrent stroke, particularly in the acute phase lasting 2 to 4 weeks after the initial event [20].

Table 4. Dual Antiplatelet Therapy

Dual Antiplatelet Therapy	n	%
ASA (1x80 mg) orally + Clopidogrel (1x75 mg) orally	30	86
ASA (1x80 mg) via NGT + Clopidogrel (1x75 mg) via NGT	4	11
ASA LD (1x320 mg) orally + Clopidogrel (1x75 mg) orally	1	3
Total	35	100

Note: ASA: Acetylsalicylic acid/Aspirin; LD: Loading Dose; NGT: nasogastric tube

Table 4 shows that the most frequently used dual antiplatelet regimen was ASA 80 mg once daily by mouth combined with clopidogrel 75 mg once daily by mouth (30/35 regimens; 85.7%). This pattern is consistent with meta-analyses showing that short-term dual antiplatelet therapy with aspirin and clopidogrel, initiated within 24 hours after high-risk transient ischemic attack or minor ischemic stroke, reduces the risk of recurrent stroke compared with aspirin alone, albeit with a modest increase in bleeding risk [21].

Dual antiplatelet therapy combining aspirin and clopidogrel is recommended in the short term (21–90 days) as secondary prevention in patients with mild ischemic stroke (NIHSS ≤3) or high-risk TIA (ABCD2 score ≥4), especially when initiated promptly (within 12–24 hours, maximum 7 days after the event). Based on the CHANCE and POINT trials, DAPT (*Dual Antiplatelet Therapy)* is more effective than aspirin alone in preventing recurrent stroke, with the greatest benefit in the first 21 days. However, use for >90 days increases the risk of bleeding without additional benefit, so after this period, therapy is usually continued with single antiplatelet therapy. However, if treatment is initiated late, *Single Antiplatelet Therapy* (SAPT) remains the primary option for long-term prevention [16].

Table 5. Antiplatelet Therapy Switching Patterns

Switching Patterns	n	%
Cilostazol (1x100 mg) orally → ASA (1x80 mg) orally + Clopidogrel (1x75 mg) orally	1	6
ASA (1x160 mg) via NGT → ASA (1x80 mg) orally + Clopidogrel (1x75 mg) orally	1	6
ASA (1x160 mg) orally → ASA (1x80 mg) orally + Clopidogrel (1x75 mg) orally	2	11
ASA (1x160 mg) orally → ASA (1x80 mg) orally	3	18
ASA (1x80 mg) orally + Clopidogrel (1x75 mg) orally → Clopidogrel (1x75 mg) orally → Cilostazol (1x100 mg) orally	1	6
ASA (1x160 mg) via NGT → ASA (1x80 mg) via NGT	1	6
ASA LD (1x320 mg) orally + Clopidogrel (1x75 mg) orally → ASA (1x80 mg) orally + Clopidogrel (1x75 mg) orally	1	6
ASA (1x160 mg) orally → Ticagrelor (1x90 mg) orally	1	6
ASA (1x160 mg) orally → Clopidogrel (1x75 mg) orally	1	6
ASA (1x80 mg) orally + Clopidogrel (1x75 mg) orally → ASA (1x80 mg) orally	1	6
ASA (1x80 mg) orally + Clopidogrel (1x75 mg) orally → ASA (1x160 mg) orally	1	6
ASA (1x80 mg) orally → ASA (1x160 mg) orally	2	11
ASA (1x160 mg) orally → Cilostazol (1x100 mg) orally	1	6
Total	17	100%

Note: ASA: Acetylsalicylic acid/Aspirin; NGT: nasogastric tube

Table 5 summarizes the 17 antiplatelet regimen switches observed during hospitalization. The most frequent switching pattern was de-escalation from ASA 160 mg once daily to ASA 80 mg once daily (3/17; 17.6%), which likely reflects dose adjustment from the acute treatment phase to the maintenance phase. Other switching patterns included changes from high-dose aspirin or dual antiplatelet therapy to single antiplatelet regimens, as well as substitution with cilostazol or ticagrelor in selected patients. In acute ischemic stroke, aspirin doses of 160–325 mg per day are recommended in the first 24–48 hours to reduce the risk of early recurrence, followed by maintenance doses of 80–150 mg per day for secondary prevention [22],[23].

In this study, hypertension was the most common risk factor, which may help explain the predominance of thrombotic stroke (97%) among patients. Most ischemic stroke inpatients had a hospital stay of ≥7 days (69%), while 31% were hospitalized for less than seven days. At discharge, 81% of patients showed clinical improvement, 7% died during hospitalization, and the remaining patients had other discharge conditions such as being clinically controlled or discharged on request. These findings indicate that ischemic stroke management often requires prolonged inpatient care and multidisciplinary support for stabilization and early rehabilitation.

This study has several limitations. As a single-centre retrospective study, the findings depend on the completeness and accuracy of medical record documentation and may not be generalizable to wider populations. In addition, the absence of follow-up information such as post-discharge recurrence or bleeding events limits the assessment of long-term effectiveness and safety of the antiplatelet regimens. Finally, potential confounding factors influencing regimen selection and switching, such as stroke severity and comorbidities, could not be fully controlled.

4. Conclusion

This study found that, among ischemic stroke inpatients at Dr. Saiful Anwar Malang Regional General Hospital, single antiplatelet therapy was used more frequently than dual antiplatelet therapy. Of 153 antiplatelet regimens identified, 118 (77.1%) were single regimens and 35 (22.9%) were dual regimens. The most commonly used single antiplatelet regimen was aspirin (ASA) 160 mg once daily by mouth (70/118; 59.3%), whereas the most frequent dual regimen was ASA 80 mg once daily by mouth combined with clopidogrel 75 mg once daily by mouth (30/35; 85.7%). A total of 17 regimen switches occurred during hospitalization, most commonly from ASA 160 mg to ASA 80 mg once daily, reflecting transition from the acute to the maintenance phase. These findings indicate that aspirin-based single antiplatelet therapy remains the predominant strategy in the inpatient management of ischemic stroke at this tertiary hospital. Further studies are needed to evaluate associations between specific antiplatelet regimens and clinical outcomes such as recurrent stroke, bleeding events, and mortality, as well as to explore factors influencing regimen selection and switching.

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Conflicts of Interest:
The author declares that there are no conflicts of interest in this research.

References

[1] J. T. DiPiro, G. C. Yee, S. T. Haines, T. D. Nolin, V. L. Ellingrod, and L. M. Posey, *Pharmacotherapy: A Pathophysiologic Approach*, 12th ed. New York, NY, USA: McGraw Hill, 2023. [Online]. Available: https://accesspharmacy.mhmedical.com/content.aspx?aid=1201057727

[2] V. L. Feigin *et al.*, "World Stroke Organization: Global Stroke Fact Sheet 2025," *Int. J. Stroke*, vol. 20, no. 2, pp. 132–144, 2025. [Online]. Available: https://doi.org/10.1177/17474930241308142

[3] Ministry of Health, Republic of Indonesia (BKPK), "Survei Kesehatan Indonesia (SKI) 2023," 2023. [Online]. Available: https://www.badankebijakan.kemkes.go.id/hasil-ski-2023/

[4] Ministry of Health, Republic of Indonesia, "Pedoman Nasional Pelayanan Kedokteran (PNPK) – Tata Laksana Stroke," 2019. [Online]. Available: https://kemkes.go.id/id/pnpk-2019---tata-laksana-stroke

[5] (AHA/ASA overview requested) "2021 Guideline for the Prevention of Stroke in Patients With Stroke and Transient Ischemic Attack," *Stroke*, vol. 52, 2021. [Online]. Available: https://www.guidelinecentral.com/guideline/7086/

[6] G. Gelbenegger and B. Jilma, "Clinical pharmacology of antiplatelet drugs," *Expert Rev. Clin. Pharmacol.*, vol. 15, no. 10, pp. 1177–1197, 2022. [Online]. Available: https://doi.org/10.1080/17512433.2022.2121702

[7] D. R. Kurniasari, "Evaluation of the rational use of antiplatelet drugs in ischemic-stroke inpatients at Dr. Moewardi Hospital, Surakarta, 2016," Undergraduate thesis, 2017. [Online]. Available: https://eprints.ums.ac.id/58576/10/Naskah%20Publikasi.pdf

[8] S. Megawati, R. Rahayu, and N. Fhatonah, "Evaluation of antiplatelet use in ischemic stroke inpatients at Tangerang District Hospital, 2019," *J. Farmagazine*, vol. 8, 2021. [Online]. Available: http://dx.doi.org/10.47653/farm.v8i1.531

[9] Samirah, R. A. Safitri, A. Machsin, Suharjono, and N. R. Zanuba, "Drug utilization study of antiplatelet in thrombotic stroke patients," *Journal of Pharmacy and Science*, vol. 10, no. 2, pp. 191–196, 2025. [Online]. Available: https://doi.org/10.53342/pharmasci.v10i2.483

[10] A. Gracias and L. Doris, "Gender differences in stroke risk and recovery," *Stroke*, 2024. [Online]. Available: *https://www.researchgate.net/publication/386099172_GENDER_DIFFERENCES_IN_STROKE_RISK_AND_RECOVERY*

[11] W. Wang, F. Han, C. Qu, and P. Sun, "Sex differences in risk factors for transient ischemic attack in a Chinese population," *Front. Neurol.*, vol. 12, 2021. [Online]. Available: https://doi.org/10.3389/fneur.2021.615399

[12] S. A. Vivi and N. Fitri, "Association of age, sex, and stroke type with quality of life among stroke patients," *J. Penelitian Keperawatan*, vol. 11, 2025. [Online]. Available: https://doi.org/10.32660/jpk.v11i1.804

[13] A. C. I. P. Zendrato and N. Barus, "Profile and management of ischemic stroke inpatients at RSU Royal Prima Medan, 2019," *J. Kedokteran STM*, vol. 4, no. 1, pp. 1–9, 2021. [Online]. Available: https://doi.org/10.30743/stm.v4i1.63

[14] P. N. Puspitasari, "Association of hypertension with stroke incidence," *J. Ilmiah Kesehatan Sandi Husada*, vol. 12, 2020. [Online]. Available: https://doi.org/10.35816/jiskh.v12i2.435

[15] N. Kesuma, D. Krismashogi, and H. Fatmawati, "Risk factors and ischemic-stroke risk level using the stroke risk scorecard at RSUD Klungkung," *Intisari Sains Medis*, vol. 10, 2019. [Online]. Available: https://doi.org/10.15562/ism.v10i3.397

[16] D. O. Kleindorfer *et al.*, "2021 Guideline for the prevention of stroke in patients with stroke and transient ischemic attack," *Stroke*, vol. 52, 2021. [Online]. Available: https://doi.org/10.1161/STR.0000000000000375

[17] R. Ariani, L. Amalia, S. Gunadharma, and K. Anggadiredja, "Efficacy and adverse drug reaction monitoring of antiplatelet therapy in post-ischemic-stroke patients at Dr. Hasan Sadikin General Hospital," *J. Sains dan Kesehatan*, vol. 5, pp. 850–859, 2023. [Online]. Available: https://doi.org/10.25026/jsk.v5i5.1944

[18] I. A. Solihah, A. Pebiansyah, and I. Amelia, "Recurrent ischemic stroke in patients on antiplatelet therapy at SMC Tasikmalaya Hospital," in *Proc. Seminar Nasional Diseminasi Penelitian*, 2024. https://ejurnal.universitas-bth.ac.id/index.php/conference/article/view/1499/1116

[19] W. J. Powers *et al.*, "Guidelines for the early management of patients with acute ischemic stroke: 2019 update to the 2018 guidelines," *Stroke*, vol. 50, 2019. [Online]. Available: https://doi.org/10.1161/STR.0000000000000211

[20] R. A. A. Putri *et al.*, "Use of dual antiplatelet therapy in ischemic stroke with prior coronary artery disease," *MAHESA*, vol. 4, 2024. [Online]. Available: https://doi.org/10.33024/mahesa.v4i12.16289

[21] S. Octariani, D. Mayasari, and A. Ramadhan, "Aspirin–clopidogrel combination vs. aspirin alone in ischemic stroke: a literature review," in *Proc. Mulawarman Pharmaceuticals Conferences*, vol. 14, pp. 405–412, 2021. [Online]. Available: https://doi.org/10.25026/mpc.v14i1.597

[22] A. J. Ansara, S. A. Nisly, S. A. Arif, J. M. Koehler, and S. T. Nordmeyer, "Aspirin dosing for the prevention and treatment of ischemic stroke: An indication-specific review of the literature," *Ann. Pharmacother.*, vol. 44, no. 5, pp. 851–862, 2010. [Online]. Available: http://dx.doi.org/10.1345/aph.1M346

[23] Vitria, "Use of antiplatelets for secondary prevention of ischemic stroke and acute coronary syndrome in Indonesia: a literature review," Undergraduate thesis, Universitas Islam Indonesia, 2022. [Online]. Available: https://dspace.uii.ac.id/bitstream/handle/123456789/38403/17613063.pdf?sequence=1&isAllowed=y