

The burden of atrial fibrillation and unmet needs of its management in Southeast Asia and South Asia

Rungroj Kittayaphong,^{a,i,*} Yodying Kaolawanich,^a Arintaya Phrommintikul,^b Mahesan Guruparan,^c Kumaran Subaschandran,^d Charantharayil Gopalan Bahuleyan,^e Narayanan Nambodiri,^f and Gregory Y. H. Lip^{a,g,h,i}

^aDivision of Cardiology, Department of Medicine, Siriraj Hospital, Mahidol University, Bangkok, Thailand

^bDepartment of Internal Medicine, Faculty of Medicine, Chiang Mai University, Chiang Mai, Thailand

^cDepartment of Cardiology, Jaffna Teaching Hospital, Jaffna, Sri Lanka

^dDepartment of Community and Family Medicine, Faculty of Medicine, University of Jaffna, Jaffna, Sri Lanka

^eCardiovascular Centre, Ananthapuri Hospitals and Research Institute, Trivandrum, Kerala, India

^fSree Chitra Tirunal Institute of Medical Sciences and Technology, Trivandrum, Kerala, India

^gLiverpool Centre for Cardiovascular Science at University of Liverpool, Liverpool John Moores University and Liverpool Heart & Chest Hospital, Liverpool, United Kingdom

^hDepartment of Clinical Medicine, Aalborg University, Aalborg, Denmark

Atrial fibrillation (AF) is a major cardiac rhythm disorder with an increasing global prevalence and significant consequences on outcomes such as ischemic stroke/systemic embolism (SSE), major bleeding, and death.¹ Racial differences in SSE and bleeding are reported between Asians and non-Asians,² thus this Comment aims to highlight the challenges of AF care in Southeast Asia (SEA) and South Asia (SA). We discuss the guideline recommendations for management of patients with AF in Asian countries, as well as the unmet needs in Thailand, India, and Sri Lanka. These countries are low-middle-income countries, with major differences in the healthcare system, access to health technology, and number of medical personnel.

The prevalence of AF in SEA is increasing at a faster rate than the global trends (Supplementary Fig. S1). Globally, it is estimated that the number of people living with AF has increased from 33.5 million in 2010 to 59 million in 2019.¹ The prevalence of AF in predominantly Caucasian populations is 1%–2%. Studies in Asia consistently report lower prevalence (1%). Despite having a relatively lower prevalence of AF, Asia has a much higher number of patients with AF due to its larger population size.³ In a cross-sectional survey of the population aged over 65 years in the northern region of Thailand, the prevalence of AF was 1.9%.⁴ Challenges in AF screening, access to medications, rate and rhythm control, and guideline implementation are elaborated in the Supplementary materials.

There are differences in the recommendations of AF screening among Asian countries. Opportunistic screening can be applied to all Asian countries,

especially for those older than 65 years. However, systematic screening for those with high risk for stroke or age more than 75 years may only be feasible in some Asian countries, particularly high-income countries with adequate healthcare resources.⁵

Many AF registries have enrolled AF patients from multiple countries, including SEA/SA. Table 1 demonstrates the profiles of study population, including oral anticoagulant (OAC) patterns and outcomes of several AF registries. Notably, the profiles of study populations vary significantly different across the registries. Direct oral anticoagulants (DOACs) are used much less in SEA/SA and Asians had more major bleeding compared to non-Asians. The mortality rate remains high, and major bleeding rates remain a significant concern among Asian AF patients.

There are differences in characteristics and outcomes between Asian and non-Asian patients with AF. The EurObservational Research Programme Atrial Fibrillation (EORP-AF) registry, which included 3049 patients from nine European countries, reported a median CHA₂DS₂-VASc score of 1.9⁷ while the cohort of antithrombotic use and Optimal INR Level in patients with non-valvular Atrial Fibrillation in Thailand registry (COOL-AF) registry from Thailand, which included 3405 patients had a median CHA₂DS₂-VASc score of 3.1.¹⁴ While the all-cause death rates were similar (4.0% in EORP-AF vs. 4.17% in COOL-AF), COOL-AF had a higher rate of SSE (0.6% in EORP-AF vs. 1.5% in COOL-AF) and major bleeding (0.3% in EORP-AF vs. 2.26% in COOL-AF). These findings highlight differences in characteristics and outcomes, underscoring the need to improve management strategies for patients in SEA.

Asians are perceived to be more 'sensitive' to OAC, with higher risks of bleeding on antithrombotic drugs—a phenomenon referred to as the 'East Asian paradox'.¹⁵ In the COOL-AF registry, OAC was used in 75.3%, with 68.5% on warfarin and 6.8% on DOACs.¹⁴ In India, the use of OACs (especially DOACs) for AF patients is



The Lancet Regional Health - Southeast Asia 2025;34: 100549

Published Online xxx
<https://doi.org/10.1016/j.lansea.2025.100549>

*Corresponding author. Division of Cardiology, Department of Medicine, Faculty of Medicine Siriraj Hospital, Mahidol University, 2 Wanglang Road, Bangkok Noi, Bangkok 10700, Thailand.

E-mail address: rungroj.kri@mahidol.ac.th (R. Kittayaphong).

© 2025 The Author(s). Published by Elsevier Ltd. This is an open access article under the CC BY-NC license (<http://creativecommons.org/licenses/by-nc/4.0/>).

ⁱCo-corresponding authors.

much lower than in Western countries. In Kerala AF, the use of OAC was 65.8%, with 58.2% on warfarin and 7.6% on DOACs.¹² It is projected that with the wide availability of generic DOACs, the use of DOACs for stroke prevention in AF patients will markedly increase.

The rate of antiplatelet use was 26.5% in the Thailand COOL-AF registry.¹⁴ In the Kerala AF Registry¹⁶ this proportion was 54.3%. The use of antiplatelets was one of the major reasons for not using OAC. Most patients who use antiplatelets are not patients with recent acute coronary syndrome or percutaneous coronary intervention.

Promotion of integrated AF care

The general management of AF has moved towards a more holistic or integrated care approach, whether expressed as the Atrial fibrillation Better Care (ABC) pathway (Avoid stroke, Better symptom management, Cardiovascular risk factors and comorbidity management), SOS (Stroke risk assessment and treatment, Optimizing all modifiable risk factors, and Symptom management using rate- and rhythm-control strategies) or

AF-CARE (Comorbidities, Avoid Stroke, Rate or Rhythm, Evaluation) in current international guidelines.^{17–19} In an observational cohort, the results of the COOL-AF study showed that, despite the suboptimal adherence to the ABC pathway, ABC pathway adherence reduces death/SSE, and heart failure by 41% and 55%, respectively, compared to non-adherence.²⁰

Many cities in Asia are among the top 25 cities with the highest levels of air pollution.²¹ A study from Beijing during 2012–2013 showed that the risk of new onset AF increased at the Odds ratio of 3.8 for each 10 µg/mm³ increase in PM_{2.5}.²² Another study from South Korea demonstrated a 4.5% increased risk of emergency AF visit for each 10 µg/mm³ increase in PM_{2.5}.²³ A systematic review of AF burden in rural areas of 11 countries, including Thailand, indicated that the overall prevalence was 2.05% (95% confidence interval 1.97–2.13%).²⁴ A study from Thailand involving rural AF patients taking warfarin showed that warfarin adherence was challenging without optimal anticoagulant management.²⁵ Data from 797 warfarin clinic in Thailand, most of which are in rural area, showed that the average Time in the Therapeutic Range (TTR) was 39.22%

Variables	(Mainly) non-Asians			Asians				
				Non-SEA				SEA
	GARFIELD ⁶	EORP-AF ^{7,8}	ORBIT-AF ⁹	APHRS ¹⁰	FUSHIMI ¹¹	KERALA ¹²	Japanese GARFIELD ¹³	COOL-AF ¹⁴
Number of patients	28,628	3049	4293	3989	3878	2507	4859	3405
Country	Global	Europe	US	Asia-Pacific	Japan	India	Japan	Thailand
Year of enrollment	2010–2014	2012–2013	2010–2011	2015–2017	2011–2012	2016–2017	2010–2016	2014–2017
Age (Mean or median)	71	68.8	75	68.5	73.7	68	71.2	67.8
Female	44.4	40.4	42	34.5	40	45.2	40.2	41.8
Asian	25	majority	<1.4	100	100	100	100	100
CAD	19.9	36.4	31.9	19.5	14.8	41.6	10.3	16.1
Ischemic stroke/TIA	12	10.5	15	9.8	20.5	14.1	9.5	17.4
Heart failure	20.6	47.5	32.1	20.8	26.7	26.4	24.6	26.8
CKD stage 3–5	10.4	13.2	34.1	7.5	35.9	42.1	9.5	
Dyslipidemia	41	48.6	71.9	39.1	43.3	46.1	29.2	56.3
Hypertension	77.5	70.9	83	61.4	62.6	61.2	67.3	68.4
Diabetes mellitus	21.7	20.6	29.4	24.8	23.1	37.2	18.3	24.6
Smoking	34.8	11.1	48.5	8.8	NA	NA	NA	19.9
Permanent AF	12.7	17.3	44.5	58	41.1	39.4	10.3	47.3
CHA ₂ DS ₂ -VAsC score (median or mean)	3	1.9	4?		3.37	3.18	3	3.1
HAS-BLED score (median or mean)	1.5	1.4	NA		1.75	1.84	1.2	1.5
Antiplatelet	27.9	30.7	47.3		28.3	48.3	16.6	26.2
OAC	63.3	80	76	79.9	53.8	65.8	86.5	75.4
Warfarin	46.3	71.6	71	17.8	43.9	58.2	18.6	68.7
DOACs	17	8.4	5	62.3	9.9	7.6	67.9	6.7
Clinical outcomes								
All-cause death	3.84	PAF 4.0 NPAF 7.3	M 5.74 F 5.46	2.7	M 5.16 F 6.42	16.48	2.13	4.17
Ischemic stroke/TIA	1.27	PAF 0.6 NPAF 1.0	M 0.78 F 1.3	0.7	M 2.39 F 2.46	2.72	1.26	1.5
Major bleeding	0.71	PAF 0.3 NPAF 1.4	M 3.56 F 4.2	1.7	M 2.08 F 1.64	NA	0.32	2.26

F, female; M, male; NA, not available; SEA, Southeast Asia; CAD, coronary artery disease; CKD, chronic kidney disease; TIA, transient ischemic attack; PAF, paroxysmal atrial fibrillation; NPAF, non-paroxysmal atrial fibrillation.

Table 1: Summary of patients' characteristics and outcomes of published atrial fibrillation registries.

reflecting poor warfarin control. This highlights an urgent need to implement strategies to improve the standard of care in rural regions.²⁶

Conclusion

The prevalence of AF in SEA is rising. AF in SEA/SA is associated with a high complication rate. Most patients are on warfarin for stroke prevention, but control is suboptimal. Integrated AF care is suboptimal, and there is an urgent need to improve AF management in SEA/SA. Currently public health projects focus on stroke prevention by the promotion of warfarin clinic. Future public health initiatives should aim to improve the AF care based on the ABC pathway.

Contributors

RK and GYHL participates in conceptualization, methodology, resources, writing—original draft of the manuscript, and writing—review & editing. YK, AP, MG, KS, CGB, and NN contributes to the methodology, resources, and writing—review & editing.

Declaration of interests

All authors declare no conflict of interest.

Acknowledgements

The authors thank Govindan Unni, MD, Jayagopal P B, MD, and Jinbert Lordson Azariah, for the assistance in the preparation of India content in the manuscript.

Funding: This study was not funded.

Appendix A. Supplementary data

Supplementary data related to this article can be found at <https://doi.org/10.1016/j.lansea.2025.100549>.

References

- 1 Linz D, Gawalko M, Betz K, et al. Atrial fibrillation: epidemiology, screening and digital health. *Lancet Reg Health Eur*. 2024;37:100786.
- 2 Kang DS, Yang PS, Kim D, et al. Racial differences in ischemic and hemorrhagic stroke: an ecological epidemiological study. *Thromb Haemost*. 2024;124(9):883–892.
- 3 Tse HF, Wang YJ, Ahmed Ai-Abdullah M, et al. Stroke prevention in atrial fibrillation—an Asian stroke perspective. *Heart Rhythm*. 2013;10(7):1082–1088.
- 4 Phrommintikul A, Detnuntarat P, Prasertwitayakij N, Wongcharoen W. Prevalence of atrial fibrillation in Thai elderly. *J Geriatr Cardiol*. 2016;13(3):270–273.
- 5 Chan NY, Orchard J, Agbayani MJ, et al. 2021 Asia Pacific Heart Rhythm Society (APHRS) practice guidance on atrial fibrillation screening. *J Arrhythm*. 2022;38(1):31–49.
- 6 Bassand JP, Accetta G, Al Mahmeed W, et al. Risk factors for death, stroke, and bleeding in 28,628 patients from the GARFIELD-AF registry: rationale for comprehensive management of atrial fibrillation. *PLoS One*. 2018;13(1):e0191592.
- 7 Lip GY, Laroche C, Dan GA, et al. A prospective survey in European Society of Cardiology member countries of atrial fibrillation management: baseline results of EURObservational Research Programme Atrial Fibrillation (EORP-AF) Pilot General Registry. *Europace*. 2014;16(3):308–319.
- 8 Boriani G, Laroche C, Diemberger I, et al. 'Real-world' management and outcomes of patients with paroxysmal vs. non-paroxysmal atrial fibrillation in europe: the EURObservational Research Programme-atrial fibrillation (EORP-AF) general pilot registry. *Europace*. 2016;18(5):648–657.
- 9 Piccini JP, Simon DN, Steinberg BA, et al. Differences in clinical and functional outcomes of atrial fibrillation in women and men: two-year results from the ORBIT-AF registry. *JAMA Cardiol*. 2016;1(3):282–291.
- 10 Tse HF, Teo WS, Siu CW, et al. Prognosis and treatment of atrial fibrillation in asian cities: 1-year review of the asia-pacific heart rhythm society atrial fibrillation registry. *Europace*. 2022;24(12):1889–1898.
- 11 Ogawa H, Hamatani Y, Doi K, et al. Sex-related differences in the clinical events of patients with atrial fibrillation- the fushimi AF registry. *Circ J*. 2017;81(10):1403–1410.
- 12 Bahuleyan CG, Namboodiri N, Jabir A, et al. One-year clinical outcome of patients with nonvalvular atrial fibrillation: insights from Kerala-AF registry. *Indian Heart J*. 2021;73(1):56–62.
- 13 Koretsune Y, Etoh T, Katsuda Y, et al. Risk profile and 1-year outcome of newly diagnosed atrial fibrillation in Japan- insights from GARFIELD-AF. *Circ J*. 2018;83(1):67–74.
- 14 Krittayaphong R, Winijkul A, Methavikul K, et al. Risk profiles and pattern of antithrombotic use in patients with non-valvular atrial fibrillation in Thailand: a multicenter study. *BMC Cardiovasc Disord*. 2018;18(1):174.
- 15 Kim HK, Tantry US, Smith SC Jr, et al. The East asian paradox: an updated position statement on the challenges to the current antithrombotic strategy in patients with cardiovascular disease. *Thromb Haemost*. 2021;121(4):422–432.
- 16 Charantharayil Gopalan B, Namboodiri N, Abdullakutty J, et al. Kerala Atrial Fibrillation Registry: a prospective observational study on clinical characteristics, treatment pattern and outcome of atrial fibrillation in Kerala, India, cohort profile. *BMJ Open*. 2019;9(7):e025901.
- 17 Van Gelder IC, Rienstra M, Bunting KV, et al. 2024 ESC Guidelines for the management of atrial fibrillation developed in collaboration with the European Association for Cardio-Thoracic Surgery (EACTS). *Eur Heart J*. 2024;45(36):3314–3414.
- 18 Chao TF, Joung B, Takahashi Y, et al. 2021 Focused update consensus guidelines of the Asia pacific heart rhythm society on stroke prevention in atrial fibrillation: executive summary. *Thromb Haemost*. 2022;122(1):20–47.
- 19 Wang Y, Guo Y, Qin M, et al. 2024 Chinese expert consensus guidelines on the diagnosis and treatment of atrial fibrillation in the elderly, endorsed by geriatric society of Chinese medical association (cardiovascular group) and Chinese society of geriatric health medicine (cardiovascular branch): executive summary. *Thromb Haemost*. 2024;124(10):897–911.
- 20 Krittayaphong R, Winijkul A, Methavikul K, Lip GYH. Impact of achieving blood pressure targets and high Time in therapeutic Range on clinical outcomes in patients with atrial fibrillation adherent to the atrial fibrillation better care pathway: a report from the COOL-AF registry. *J Am Heart Assoc*. 2023;12(3):e028463.
- 21 IQAir. *Most polluted major city ranking*. 2023. <https://www.iqair.com/th-en/world-air-quality-ranking>. Accessed July 8, 2024.
- 22 Liu X, Kong D, Liu Y, et al. Effects of the short-term exposure to ambient air pollution on atrial fibrillation. *Pacing Clin Electrophysiol*. 2018;41(11):1441–1446.
- 23 Kwon OK, Kim SH, Kang SH, et al. Association of short- and long-term exposure to air pollution with atrial fibrillation. *Eur J Prev Cardiol*. 2019;26(11):1208–1216.
- 24 Gavino AI, McLachlan CS. Review of screening studies for atrial fibrillation in rural populations of 11 countries. *SAVE Proc*. 2017;30(3):280–285.
- 25 Pongkaew A, Tankumpuan T, Riangkam C, et al. Warfarin adherence and its associated factors in Thai older adults with atrial fibrillation. *J Multidiscip Healthc*. 2024;17:4455–4464.
- 26 Thongsri T, Chanprasertpinoy W, Wongtheptien W, Wattanasombat S, Suami C, Krittayaphong R. Optimal INR level in nonvalvular atrial fibrillation patients in Thailand: a multi-site study. *J Med Assoc Thai*. 2023;106(12):1147–1153.