

MRI landscape in Southeast Asia

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Dear Editor,

Magnetic resonance imaging (MRI) is used in the diagnosis, monitoring of disease progression and treatment planning,¹ especially of non-communicable diseases that account for 62% of all deaths in Southeast Asia (SEA).² However, the density of MRI scanners in SEA (1.1 per million population) is much lower compared to other regions.³ This study aims to describe the general state of MRI services in Southeast Asian countries in order to better understand the landscape, challenges and areas of need.

An online survey was conducted and disseminated via email to staff in radiology departments in countries across SEA in January 2023, through international and local radiological organisations. The results were collated over a 3-month period. The survey covered basic MRI scanner information, availability and accessibility, level of MRI scanning services, challenges faced in providing MRI services and a wish list for MRI services (Table 1). Hospitals in lower-middle-income countries (LMIC) were evaluated and compared to hospitals in upper-middle-income countries (UMIC) and high-income countries (HIC). The average of quantitative answers and majority consensus on categorical answers were taken for respondent hospitals with multiple responses. Quantitative variables are represented by median and range, while categorical variables are represented by percentages.

The survey gathered 77 responses from 57 hospitals located in 8 countries across SEA. Of these, 26 responses were from 21 hospitals in LMIC (i.e. Indonesia, the Philippines, Vietnam, Myanmar and Laos), while 51 responses were from 36 hospitals in UMIC and HIC (i.e. Malaysia, Thailand and Singapore) (Fig. 1).

The mean radiologist-to-bed ratio was 1:62.1, and the mean radiographer-to-bed ratio was 1:26.9 among respondent hospitals in SEA. The median (range) number of radiographers in respondent hospitals in UMIC and HIC was almost twice the median number in radiographers seen in LMIC (20 [3–80] versus [vs] 34.3 [2–200]; $P=0.009$). No significant difference was observed between LMIC respondent hospitals

Table 1. Key topics covered in the survey.

Key topics	Description
Basic hospital information	Type of hospital Type of patients served Radiology staff strength
MRI scanner information	Number and type of MRI scanners Average daily MRI scans per scanner Wait time Utilisation
Level of MRI scanning services	Scanning of patients under special conditions Use of contrast agents Basic and advanced protocols
MRI scan pricing	Price range Patient's mode of payment
Barriers and needs	Challenges faced in MRI service provision Wishlist for MRI services

MRI: magnetic resonance imaging

and UMIC and HIC respondent hospitals for the number of radiologists (14 [2–70] vs 11 [1.5–60]; $P=0.310$).

Most of the respondent hospitals in SEA (65.3%) had only 1 MRI available (median [range], 1 [0–10]), which were mostly of 1.5 Tesla strength. A greater percentage of respondent hospitals in UMIC and HIC had 3T MRI available, compared to LMIC. The median (range) percentage of utilisation observed was 90% (10–150%), where 9.5% of respondent hospitals had less than 50% of utilisation which were mainly of smaller size (bed number ≤ 500).

Patients' mode of payment for MRI scans among respondent hospitals was mostly either fully (40.4%) or partially (40.4%) government-funded. Notably, out-of-pocket payments (8.5%) were from LMIC respondent hospitals.

In terms of case complexity, respondent hospitals in SEA provided scanning services for patients with pacemakers and cochlear implants (45.8%), under sedation (89.4%) and under general anaesthesia (66.0%). The percentage of respondent hospitals

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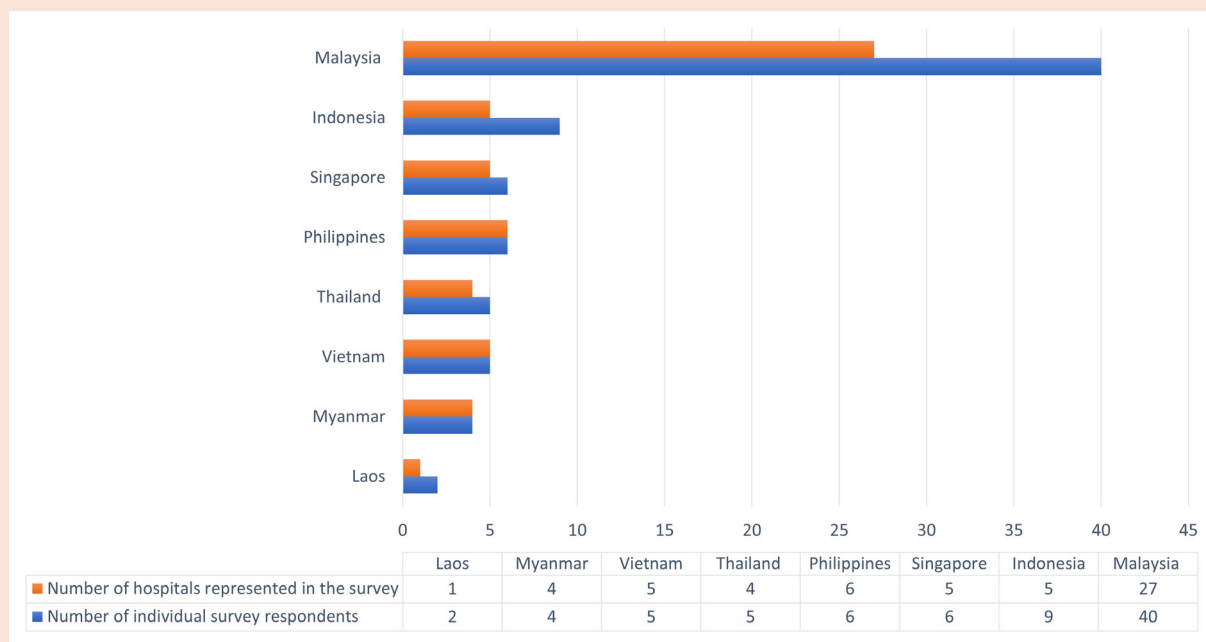
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Fig. 1. Distribution of respondents and their hospitals among Southeast Asian countries.



providing scanning services for patients with pace-makers and cochlear implants in LMIC was approximately a quarter ($P=0.002$), and for those under general anaesthesia ($P<0.001$) was less than half, compared to UMIC and HIC.

Most respondent hospitals in SEA have highlighted the current state of insufficient resources and increasing demand for MRI services in the challenges and wish list section of the survey. Almost all respondent hospitals have stated the lack of MRI equipment and the need for more MRI systems and provision of advanced MRI protocols. As a result, the need to train the radiology workforce that includes radiologists, radiographers and medical physicists was mentioned, including the expertise for using advanced MRI protocols. Despite the demand for more MRI services, the lack of government funding and long wait times were highlighted. Some respondent hospitals had indicated the need for MRI system infrastructure upgrade. There have also been delays with repair and purchase of parts for the MRI system due to little vendor support and red tape with the procurement process.

Shortage of adequately trained radiology staff in SEA could be addressed through improving training and education among Southeast Asian countries, by collaborating to provide unified region wide strategies. Imaging Southeast Asia (iSEA), for example, is a regional network aiming to facilitate training and education by coordinating with local societies among Southeast Asian countries.⁴ These efforts could extend to an integrated regional teleradiology across

SEA, boosted by artificial intelligence capabilities in workflow, could provide high-end image interpretation services to underserved areas, and could aid in training radiologists by exposing them to a variety of cases.⁵

MRI scanner availability in SEA, especially in LMIC, could be improved by introducing mobile MRI programmes using low-field portable MRI scanners as they are suitable for less urbanised areas as a point-of-care tool, especially in areas that do not have the funds, infrastructure and expertise to operate a higher field MRI system.⁶ Additionally, the donation of MRI scanners implemented through structured frameworks, similar to initiatives such as RAD-AID donating imaging equipment to hospitals after performing a Radiology Readiness Assessment,⁷ would be another approach to increase MRI scanner availability. Given that investment in imaging, especially in LMIC, has been a problem due to inadequate resources and investment plans to procure imaging equipment and more importantly, imaging has not been given priority in healthcare planning.³ The governments of countries in SEA should invest in MRI services due to the vast potential of economic benefits along with health benefits from scaling up MRI services.⁵ In May 2025, the 78th World Health Assembly adopted a milestone resolution “Strengthen medical imaging capacity”, recognising that medical imaging is vital for the diagnosis and treatment of diseases, acknowledging the global disparities in access to medical imaging, and urging member states to promote and develop strategies to improve

medical imaging capacity.⁸ The Lancet Oncology Commission on Medical Imaging and Nuclear Medicine has determined that a scale-up of MRI alone would increase the 5-year net survival among patients with selected cancer types by 1% in SEA and there would be a return of USD209 for every USD1 invested in the scale-up of imaging in Asia.^{5,9}

It is evident that the MRI services and resources present in Southeast Asian countries are insufficient in fulfilling patient needs, especially in LMIC. Hence, necessary actions should be taken to address unmet patient needs.

Ethics statement

Not applicable. The study did not involve patients. The survey was conducted among hospital professionals.

Declaration

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