Health insurance coverage among men and women in six countries within the Southeast Asia Region (2015–2022): a multilevel analysis of Demographic and Health Surveys

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Summary

Background Equitable access to quality healthcare without financial hardship is key to achieving Universal Health Coverage (UHC), especially in low- and middle-income countries in the WHO Southeast Asia Region (SEAR). Despite health insurance programmes, high out-of-pocket expenditures remain a barrier. This study evaluates health insurance coverage in SEAR, analysing socioeconomic and demographic factors.

Methods This cross-sectional study used data from Demographic and Health Surveys (2015–2022) conducted in countries within the SEAR (data from six countries for women and five for men). Our analysis separately examined women and men aged 15–49 years using data from their respective individual Demographic and Health Survey datasets. Pooled estimates of health insurance coverage were calculated with 95% CI. Multilevel logistic regression quantified variations at the country and community-levels and identified factors influencing health insurance uptake.

Findings Health insurance coverage varied across SEAR, with Indonesia reporting highest for women (58.2%; 95% CI: 57.65–58.72) and men (56.6%; 95% CI: 55.31–57.88), while lowest in Bangladesh for women (0.3%; 95% CI: 0.22–0.39) and Myanmar for men (1.4%; 95% CI: 1.04–1.83). Indonesia also had highest social security health insurance (women: 31.0%; 95% CI: 30.49–31.49, men: 27.9%; 95% CI: 26.74–29.03). Private insurance was lowest in Myanmar (women: 0.6%; 95% CI: 0.42–0.72, men: 0.9%; 95% CI: 0.60–1.27) and highest in Indonesia (women: 28.0%; 95% CI: 27.54–28.5, men: 30.0%; 95% CI: 28.81–31.14). Health insurance coverage was higher among individuals with higher education, greater exposure to mass media, rural residence, and older age. Insurance uptake was influenced by contextual factors beyond individual characteristics. India had highest community-attributable variation in health insurance uptake [women (53.1%; 95% CI: 52.56–53.62); men (56.3%; 95% CI: 55.17–57.46)], while lowest in Indonesia among women (17.7%; 95% CI: 16.40–18.99) and Maldives among men (10.8%; 95% CI: 6.71–16.84), after adjusting for demographic and socioeconomic factors.

Interpretation With an ageing population, healthcare demand and costs in SEAR will rise. Context-specific health insurance policies and targeted interventions are crucial for bridging coverage gaps and achieving UHC.

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Keywords: WHO Southeast Asia Region (SEAR); Universal Health Coverage (UHC); Health insurance; Low- and middle-income countries (LMICs); Demographic Health Survey (DHS); Multilevel regression

Introduction

The UN Sustainable Development Goal (SDGs) target 3.8 emphasises access to basic health services for populations through universal health coverage (UHC) and promoting it as a prerequisite for health and human security, aiming to ensure that citizens have access to quality essential health services without financial hardship.[1] While countries across the globe have

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Research in context

Evidence before this study

We conducted a systematic review to identify articles that reported estimates of health insurance coverage among adults in the low- and middle-income countries (LMICs) within the WHO Southeast Asia Region (SEAR). We searched PubMed for articles published between Jan 1, 2010, and Nov 30, 2024, with no restrictions on language. We included the terms "health insurance" or "financial protection against OOPE" or "health protection" or "social security health insurance" or "community health insurance" or "Universal Health Coverage" or "private health insurance" AND "adult women" or "adult men" or "adults". Three original articles based on LMICs, of which two were based in south Asia, investigated insurance coverage. While these studies examined health insurance coverage among adults, they did not analyse coverage separately for men and women or investigate the socioeconomic determinants influencing coverage. Moreover, these studies did not account for variations in coverage due to country-specific and contextual factors within SEAR. The literature on health insurance coverage in SEAR primarily focuses on individual countries and specific types of insurance, such as social health insurance or community-based health insurance.

Added value of this study

This study is the first to report health insurance coverage among nearly one million individuals and 46,231 primary sampling units (PSUs) across SEAR. It includes data from 839,241 individuals and 33,988 PSUs across six countries for women (aged 15–49 years), and 115,786 individuals and 12,243 PSUs five countries for men (aged 15–49 years). At the regional level, women were less covered by health insurance compared to men. Despite marked cross-country differences, pooled estimates indicate that approximately one in five women in the region were covered by any form of health insurance. Among these women, approximately one in eight were enrolled in social security schemes, while just one in thirteen had privately purchased or commercial insurance. In contrast, one in four men in the region had any health insurance coverage, with the highest prevalence observed in Indonesia (56.6%) and the lowest in Myanmar (1.4%). Low coverage was significantly associated with adults who had no formal education or lacked media exposure. Insurance coverage is more accessible among populations with higher educational attainment and within higher wealth quintiles. In SEAR, insurance uptake cannot be fully explained by individual characteristics, suggesting that important contextual factors may be operating at both country and cluster levels. As explained by multilevel regression, India exhibited the highest community-level variation in coverage of any health insurance- 53.1% among women and 56.3% among men-after adjusting for key individual socioeconomic characteristics. In contrast, the lowest variation was observed in Indonesia for women (17.7%) and in the Maldives for men (10.8%). Unexplained community-level variations in insurance coverage suggest that socio-contextual factors play a crucial role in shaping subscriptions to health insurance across countries in the SEAR.

Implications of all the available evidence

The low coverage of health insurance in countries of the SEAR presents a growing challenge, particularly as these nations face an epidemiological transition and an ageing population, both of which will intensify healthcare demand and drive up costs. This scenario is likely to make healthcare access increasingly costly and challenging for individuals, thereby emphasising the urgency of expanding health coverage. Achieving universal health coverage (UHC) is a fundamental aim of the UN's Sustainable Development Goals (SDGs) and reducing inequalities in access to healthcare and expanding risk-pooling mechanisms are critical strategies for reaching this target. For LMICs in SEAR, rapidly scaling up health insurance coverage is essential if they aim to leverage it as a tool for achieving UHC. Our results provide key insights that can guide policymakers in achieving UHC by providing contextual benchmarks for health coverage across SEAR; determining population groups that are currently least likely to be insured; and identifying similar countries that have achieved high health insurance coverage despite similar economic challenges, which may thus provide important policy lessons to close the gaps in SEAR's health insurance landscape.

strongly committed to this goal, the progress remains slow.[2–5] According to a recent report by the WHO, the global effort of achieving UHC is falling behind, with progress stagnating since 2015.[6] This situation is more pronounced in the low- and middle-income countries (LMICs) wherein though significant improvements have been achieved in service coverage, the proportion of population facing catastrophic out-of-pocket expenditures (OOPE) has witnessed the largest increase.[6,7]

Equitable access to quality healthcare without financial hardship has become a priority towards achieving UHC in many low and middle-income countries.[4,8,9] The WHO Southeast Asia Region (SEAR), home to nearly one fourth of the global population, bears a disproportionate share of the global burden of disease and mortality.[7,10,11] The SEAR, comprising of 11 Member States—Bangladesh, Bhutan, India, Indonesia, Maldives, Myanmar, Nepal, North Korea, Sri Lanka, Thailand, and Timour-Leste, face significant challenges in achieving equitable access to healthcare and UHC except for the North Korea, Thailand and Sri Lanka.[10] The economic landscape in the region is marked by high poverty rates, ranging from nearly 5% in India[12] to 50% in Myanmar[13] and a

substantial reliance on informal employment, which constitutes 46% of the workforce in the Maldives and as much as 90% in Bangladesh.[14]

Health spending in the SEAR remains comparatively low (Table 1), accounting for just 5.49% of gross domestic product (GDP), the lowest among all WHO regions and well below the global average of 7.33% in 2021.[7] While public health spending increased during the pandemic, it remains less than half of the international benchmarks required to achieve UHC in the region.[6] To achieve UHC, each LMIC in SEAR would need to allocate between 5% and 7.5% of their GDP.[7,10,15] The financial strain on households is also evident in this region. In 2019, 56.8 million people globally were pushed below the US$1.90-a-day poverty line due to OOPE on health,[16] with the SEAR contributing over half of this total, affecting 39.4 million individuals.[7] Despite efforts to reduce the share of OOPE, SEAR remains the only WHO region where OOP-induced impoverishment has increased in the recent decades based on the Purchasing Power Parity (PPP) US$ 1.90-per-day poverty line.[17]

One of the core strategies to achieve UHC is an affordable and sustainable health financing system which include both private as well as public financing.[2,5] While nations aspire to provide their citizens with equitable access to quality health care without any financial hardship, the reality often falls short. To bridge this gap, governments in LMICs have turned toward dedicated health insurance systems, which offer mechanisms to tackle the challenges of healthcare financing and delivery.[9,18–20] In SEAR, the health system of the countries presents a diverse picture. While private healthcare providers play a substantial role in India, Bangladesh and Indonesia accounting for 60–80% of outpatient visits and 40–60% of inpatient cases, public healthcare emerges the primary provider in Bhutan, Sri Lanka, and Timor-Leste.[17,21] In terms of health financing, countries in the SEAR have adopted a mix of social security health insurance (SSHI) and privately purchased or commercial health insurance, each tailored to the country's healthcare infrastructure, economic context, and policy landscape. However, each country has its own challenges in providing financial coverage. While Indonesia, India and Bhutan provide broad coverage to its population through social insurance schemes, financial sustainability and inequities in access is a key problem.[22–24] On the other hand, Nepal's Social Health Insurance Program (NHIP) covers only 21.4% of the population, with high dropout rates.[25] OOPE is the major source of health financing in Bangladesh and Myanmar accounting for more than 50% of their total health expenditures.[26,27] Thailand provides UHC to its citizen through a predominantly tax financed health insurance schemes,[28] while health insurance scheme in Maldives is funded by the national budget with no spending caps for eligible services.[29]

Previous research, including systematic reviews and grey literature, has provided descriptive statistics and, in some cases, identified determinants of health insurance coverage in LMICs such as India,[30] Indonesia,[31] Myanmar,[27] the Maldives,[5] and Nepal.[25] However, there is a lack of rigorous context-specific evidence on health insurance coverage across the entire SEAR, particularly in relation to the type of health insurance among adult women and men. To date, no study has quantitatively explored how individual, contextual and country-level characteristics contribute to

Country	Poverty (%)	Unemployment rate (%)	Informal employment rate (%)	Current health expenditure as % of GDP	Current health expenditure per Capita (US$)	Out-of-pocket expenditure as % of current health expenditure	Out-of-pocket expenditure per capita (US$)	Tax rate on private health insurance premiums
Bangladesh	18.7	4.3	90.0	2.4	57.9	73.0	42.3	15% VAT
Bhutan	8.2	2.7	58.0	3.6	91.0	29.0	26.4	No Tax
North Korea	NA	NA	NA	NA	NA	NA	NA	NA
India	5.0	9.2	87.0	3.3	74.0	49.8	36.9	18% GST
Indonesia	9.4	5.3	59.3	3.7	160.6	27.5	44.2	10% VAT
Maldives	5.4	4.4	46.0	10	1038.70	14.3	148.8	6% GST
Myanmar	49.7	3.0	85.7	5.6	65.2	70.3	45.8	5% CT
Nepal	20.3	10.9	81.0	5.4	65.3	51.3	33.5	13% VAT
Sri Lanka	4.1	4.8	60.0	3.8	127.0	38.0	48.3	15% VAT
Thailand	6.8	1.0	55.0	3.9	277.0	12.0	33.2	7% VAT
Timor-Leste	41.8	3.4	80.0	5.0	100	30.0	30.0	No Tax

NA: Not available; GST: Goods and Services Tax; VAT: Value Added Tax; CT: Commercial Tax; Data for North Korea is not available due to limited access to reliable sources. Sources: Poverty Data: Bangladesh, Indonesia, Maldives, Sri Lanka, Thailand, Timor-Leste (Asian Development Bank, 2022); India (Household Consumption Expenditure Survey (HCES) 2022–23); Myanmar (United Nations Development Programme, 2023); Nepal (Nepal Living Standards Survey, 2022–23); Bhutan (World Bank, 2021). Unemployment Rate and Informal Employment Rate: Organization for Economic Co-operation and Development (OECD), 2023. Current Health Expenditure and Out-of-Pocket Expenditure: WHO Regional Health Observatory - Southeast Asia, 2023.

Table 1: **Health finance characteristics of countries within Southeast Asia Region.**

variations in health insurance coverage throughout the region. Our study addresses these gaps in four keyways. First, we provide comprehensive estimates of health insurance coverage across SEAR and for individual countries within the region. Second, we disaggregate health insurance coverage into three categories: any health insurance, social security health insurance, and privately purchased or commercial insurance. Third, we conducted separate estimates for men and women. While increasing body of research has documented how targeted programs have led to increase in access to healthcare and financial protection for women, there is paucity of information on whether women across socio-economic strata have been included under the health financing schemes – both public and private.[32,33] This insight is essential to prevent the programs from reinforcing the existing social inequalities and ensure that benefits accrue to all eligible population regardless of gender. Fourth, we employed multilevel regression analysis on pooled Demographic Health Survey (DHS) data from six LMICs within SEAR, allowing us to examine the determinants of two key coverage types-any health insurance and SSHI, while capturing the interactions between individual characteristics and contextual factors.

Through analysis of large, nationally representative DHS data from six LMICs within SEAR, our study aims to assess health insurance coverage by type, identify high-performing countries, and quantify the variations in coverage of health insurance due to contextual and key socioeconomic and demographic characteristics across SEAR. Understanding the variability in health insurance coverage among different population groups will provide policymakers with a deeper understanding of health insurance coverage disparities, monitor equity in the pursuit of UHC and help identify priority population groups for targeted interventions.

Methods

Data source

Our analysis of health insurance coverage focused on six countries in SEAR: Bangladesh, India, Indonesia, Maldives, Myanmar, and Nepal. These countries were selected based on the availability of DHS data. We used the most recent DHS data conducted in these LMICs between 2015 and 2022. The DHS are nationally representative, cross-sectional household surveys conducted primarily in LMICs, valued for their robust data on health and welfare indicators for both men and women. The DHS implements standardised procedures across countries, ensuring a consistent and unified analysis of health insurance coverage and its related factors. A comprehensive description of the DHS sampling strategies, questionnaires, data collection methods, and validation procedures can be found in published sources. Briefly, the DHS employs a multistage stratified sampling design. In the first stage, countries were divided into regions based on political or geographical boundaries, further stratified by urban and rural residence. Within these strata, enumeration areas were randomly selected from the latest population census, with selection probabilities proportional to their population size. In the second stage, all households within the selected clusters were listed, and approximately 25 households within a cluster are randomly selected for an interview by equal-probability systematic sampling.[34] Over the years, DHS data has been instrumental in shaping both national and global policies, influencing intervention strategies and advocating for programs aimed at improving population health.[20] Our analysis separately examined women and men aged 15–49 years using data from their respective individual DHS datasets. Among the six countries included in our analysis, Bangladesh did not have a men's dataset in the most recent standard DHS survey. Of the remaining five countries, Nepal, Myanmar, and the Maldives provided data for men aged 15–49 years, while India and Indonesia had data available for men aged 15–54 years. To maintain consistency and ensure a uniform analytical approach across all countries, we excluded the age group 50–54 years from India and Indonesia. Sample included in each country for both women and men were presented in Supplementary information (Supplementary Appendix 1). The characteristics of the included DHS countries are presented in Table 2. The DHS received central approval from the ICF International Institutional Review Board (Calverton, MD, USA) and was also approved by individual review boards in each participating country.[35] This study is based on the anonymised and publicly available data from the Demographic and Health Survey (DHS), accessible at https://dhsprogram.com/data/available-datasets.cfm. Data Access was granted through a data-use agreement approved by ICF International.

Outcome

Health insurance coverage was assessed by three indicators namely, any health insurance, social security health insurance, and privately purchased or commercial insurance, for both women and men across the selected countries in the SEAR. For Any health insurance, respondents were asked, "*Are you covered by any health scheme or health insurance?*" with the binary response options of 'yes' or 'no.' These responses were used to determine the overall health insurance coverage in the population. For SSHI, the analysis focused on government-provided insurance schemes designed either as part of employment benefits or broader social security programs, including both contributory models funded through payroll contributions and non-contributory schemes financed directly by the government. For privately purchased health insurance, the category included private employer medical reimbursements, community health insurance, and

Countries	Year	Response rate (%)	Residing in rural areas (%)	Lowest wealth quintile (%)	No education (%)	No exposure to mass media (%)	Mean age	Unweighted sample (N)
Women (aged 15–49 years)								
Bangladesh	2022	98.9	71.5	18.4	14.1	42.4	31.9	30,078
India	2019–21	97.0	67.5	18.5	22.4	22.5	30.4	7,24,107
Indonesia	2017	98.0	48.5	17.1	1.7	2.7	31.9	49,627
Maldives	2016–17	84.0	55.5	18.1	4.2	1.6	30.5	7699
Myanmar	2015–16	96.0	70.8	17.7	12.5	13.0	31.7	12,885
Nepal	2022	97.0	31.4	17.7	25.6	21.1	29.8	14,845
SEAR			65.8	18.4	20.6	21.7	30.6	8,39,241
Men (aged 15–49 years)								
Bangladesh	Survey data not available for men							
India	2019–21	91.6	64.7	16.8	10.5	12.0	30.6	93,267
Indonesia	2017	96.0	50.6	17.1	1.2	1.9	37.5	8527
Maldives	2016–17	68.5	77.7	22.9	3.0	2.4	29.3	4342
Myanmar	2015–16	91.0	71.5	18.8	12.1	8.4	31.5	4737
Nepal	2022	95.0	29.5	15.3	8.0	15.2	29.8	4913
SEAR			63.0	17.0	9.5	10.9	31.0	1,15,786

Lowest wealth quintile refers to the individuals who comes under 1st quintile at the time of survey in DHS; No exposure to mass media was constructed based on the self-reported information on frequency of listening radio, reading newspaper and watching television; Place of residence (urban and rural) was determined by the self-reported responses; mean age was based on the individuals' age between 15 and 49 years.

Table 2: **Characteristics of Demographic and Health Surveys (DHS) in countries within the Southeast Asia Region (SEAR) for women and men (aged 15–49 years).**

privately purchased insurance plans. We listed the variables included in creation of SSHI and private health insurance in supplementary information (Supplementary Appendix 2).

Socioeconomic and demographic covariates

We considered selected demographic and socioeconomic characteristics to understand the determinants of coverage of health insurance. The selection of independent variables was guided by previous studies[30,31,36] conducted in LMICs on the determinants of health insurance coverage. Additionally, we included variables that are consistently available across all countries. Individual's age was determined based on reporting of current age and grouped as follows: 15–24 years, 25–34 years, and 35–49 years. The marital status of individuals was categorised as: never in union, married/living with partner and widowed/divorced/separated. The level of education, as self-reported by respondents, was classified into four groups: no education, primary, secondary, and higher education. Household wealth was a composite measure provided by the DHS, constructed using factor analysis based on the availability of household assets (e.g., mobile phone, car, television, radio) and characteristics (e.g., type of cooking fuel, drinking water source, type of flooring, and toilet facility). Household wealth was grouped into five quintiles (the differences may be due to opportunity gap): poorest, poor, middle, rich and richest, and these groups were further categorised as poor (poorest and poor), middle, and rich (rich and richest). Exposure to mass media was constructed based on the self-reported information on frequency of listening to radio, reading newspaper and watching television and grouped into three categories as: not at all, less than a week and at least once a week. Information on head of the household (male and female) and place of residence (urban and rural) was determined by the self-reported responses.

Statistical analysis

We estimated the coverage of any health insurance, SSHI, and privately purchased or commercial health insurance separately for women in six LMICs and for men in five LMICs using individual-level DHS data. Given the complex survey design of DHS, which involved cluster sampling, we applied sampling weights to adjust for differential selection probabilities and calculated weighted proportions with 95% CIs for each country. To derive pooled regional estimates, a two-stage method was used, firstly country specific weighted proportions were calculated, and secondly these were pooled using a random effects meta-analysis using DerSimonian-laird method via the *metaprop* command in Stata version 16. Pooled estimates from meta-analysis can be interpreted as an estimate of the value for a typical country in the SEAR, based on analysis of data from the six available countries.

Factors influencing the any health insurance coverage and social security health insurance were examined using three-level random intercept binary

regression models with individual at level 1 (i), nested within a community (PSU) at level 2 (j), and country at level 3 (k). We have shown null model and full model adjusting for selected demographic and socioeconomic characteristics:

$$\text{Health insurance coverage}_{ijk} = \beta_0 + \beta age_{ijk} + \beta SES_{ijk} + (e_{0ijk} + u_{0jk} + v_{0k})$$

In this model, β_0 represents the average value of health insurance coverage, when all independent variables are at their zero points. The coefficients βage_{ijk} and βSES_{ijk} correspond to individual level predictors, such as age and socioeconomic status, respectively. The expression also includes random effects, denoted by e_{0ijk}, u_{0jk} and v_{0k}. Here v_{0k} is the country-specific residual that shows departure of each country from the overall average of health insurance; u_{0jk} is a community level residual, reflecting differences across communities within countries; and e_{0ijk} is an individual level residual, accounting for variations specific to individuals.

Variance partition coefficients (VPC) were calculated for health insurance subscription at each defined level, indicating the degree to which individuals within a study population are more similar to each other than to individuals from other populations in terms of outcomes. For example, the proportion of total variation in health insurance subscription attributable to community and country was calculated as:

$$VPC_{community} = \frac{\sigma_u^2 + \sigma_v^2}{\sigma_u^2 + \sigma_v^2 + \sigma_e^2} \text{ and; } VPC_{country} = \frac{\sigma_v^2}{\sigma_u^2 + \sigma_v^2 + \sigma_e^2}$$

where σ_u^2 and σ_v^2 represent the variances at the community and the country level, respectively.[30] We employed the penalized quasi-likelihood (PQL) approximation procedure, which is considered the least biased for binary response data. The DHS sample design follows a hierarchical structure, and the multilevel method accounts for these data hierarchies by incorporating residual components at each level. However, Stata does not natively support survey-weighted multilevel modelling, our models estimate variance components using unweighted data, a standard approach in similar studies.[30,37] No missing data were found for the selected outcomes under investigation.

Role of the funding source
There was no funding source for this study.

Results

Table 2 summarises the country-level characteristics of the study participants, providing a comprehensive overview of women and men aged 15–49 years surveyed in six countries within SEAR. The individual response rate for women ranged from 84% in the Maldives to 98.9% in Bangladesh, resulting in a total sample of 839,241 women aged 15–49 years across 33,988 Primary Sampling Units (PSUs). The proportion of women residing in rural areas varied substantially, with the highest proportion observed in Bangladesh (71.5%) and the lowest in Nepal (31.4%). The proportion of women with no education varied considerably, from as low as 1.7% in Indonesia to as high as 25.6% in Nepal. Similarly, women with no exposure to mass media varied significantly, ranging from 1.6% in the Maldives to 42.4% in Bangladesh. The mean age of women participants across countries was relatively consistent, ranging from 29.8 years in Nepal to 31.9 years in Bangladesh and Indonesia.

In contrast, the response rate for men was generally lower than for women, varying from 68.5% in the Maldives to 96.0% in Indonesia, with data unavailable for men in Bangladesh. The total sample for men included 115,786 individuals across 12,243 PSUs in five SEAR countries. Men consistently reported higher levels of education and greater exposure to mass media than women across all countries. The proportion of men with no education ranged from 1.2% in Indonesia to 12.1% in Myanmar. The percentage of men with no exposure to mass media ranged from 1.9% in Indonesia to 15.2% in Nepal. The proportion of men residing in rural areas was highest in Maldives (77.7%) and lowest in Nepal (29.5%), mirroring trends observed among women. The mean age of men surveyed was slightly higher than that of women, ranging from 29.3 years in the Maldives to 37.5 years in Indonesia.

Regional pooled estimate for any health insurance coverage was 18.1% (95% CI: 3.10–33.10) among women and 23.3% (95% CI: 4.70–42.00) among men (Fig. 1). SSHI coverage was reported with pooled estimates of 12.7% (95% CI: 2.80–22.70) for women and 15.5% (95% CI: 0.40–30.60) for men. Privately purchased health insurance had pooled estimates of 7.7% (95% CI: 3.00–12.40) among women and 11.3% (95% CI: 4.90–17.80) among men. Country specific coverage showed that Indonesia had the highest coverage of any health insurance, with 58.2% (95% CI: 57.65–58.72) among women and 56.6% (95% CI: 55.31–57.88) among men. India followed, with 29.8% (95% CI: 29.62–29.91) among women and 33.3% (95% CI: 32.75–33.84) among men. In contrast, Bangladesh reported the lowest coverage, with only 0.3% (95% CI: 0.22–0.39) of women insured. SSHI coverage was highest in Indonesia, with 31.0% (95% CI: 30.49–31.49) among women and 27.9% (95% CI: 26.74–29.03) among men, whereas Maldives reported no coverage. Privately purchased health insurance was most prevalent in Indonesia, covering 28.0% (95% CI: 27.54–28.5) of women and 30.0% (95% CI: 28.81–31.14) of men, while Myanmar had the lowest coverage at 0.9%

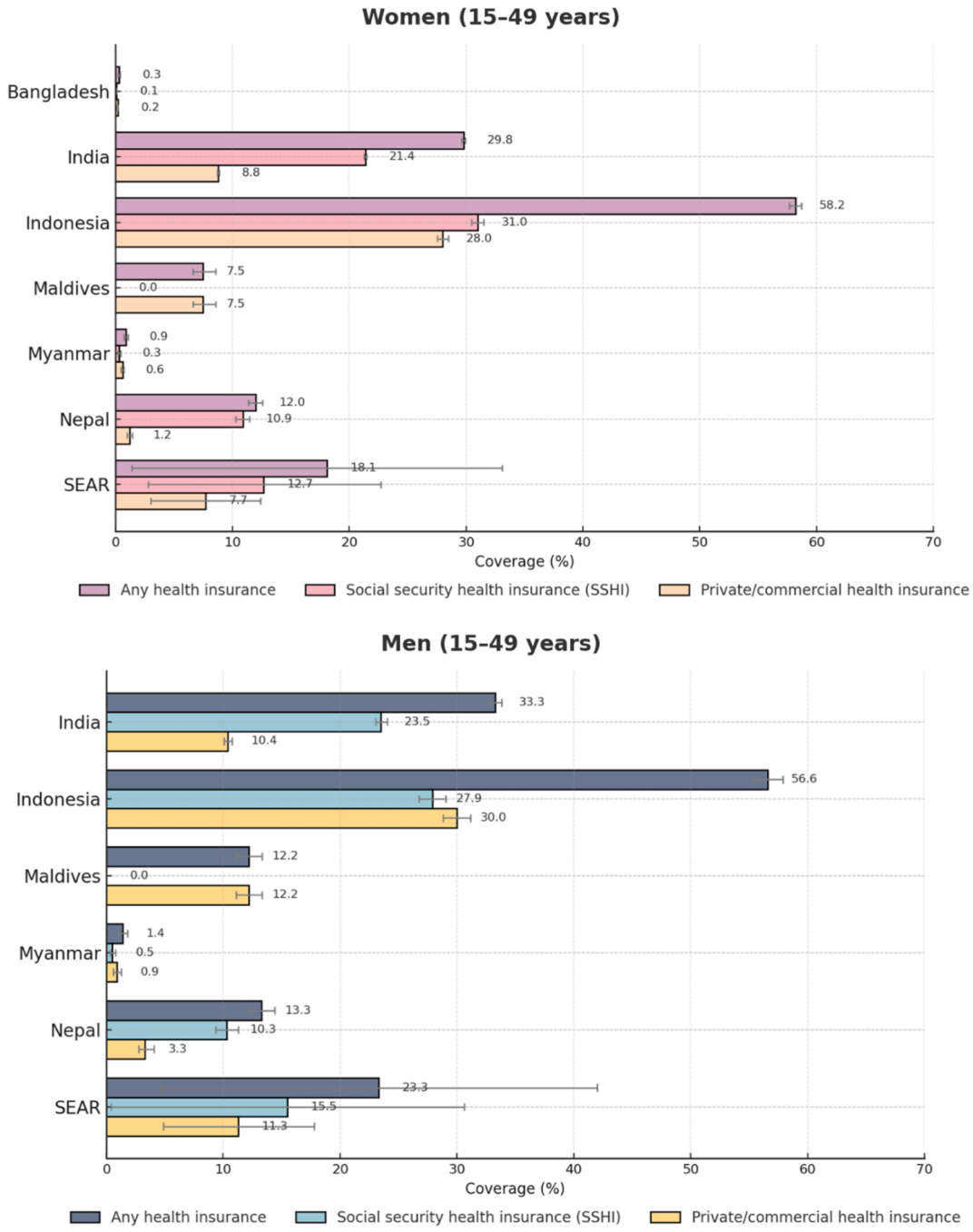

Fig. 1: **Coverage (%) of any health insurance, social security health insurance, and privately purchased health insurance in Southeast Asia Region (SEAR) for women and men (aged 15–49 years).** Note: The information included in social security health insurance and privately purchased or commercial and other health insurance were presented in Supplementary Appendix 2. Meta-analytic pooled estimates for SEAR were based on random-effects meta-analysis using the DerSimonian-Laird method to account for between-country heterogeneity.

(95% CI: 0.60–1.27) among men and 0.6% (95% CI: 0.42–0.72) among women.

Health insurance coverage across the SEAR countries varied significantly by socioeconomic and demographic factors, with coverage increasing among women and men with advancing age, higher education levels, greater exposure to mass media, and residing in rural areas (Supplementary Appendix 3 and 4). Among

women, aged 35–49 years had the highest coverage across all categories with 35.2% having any form of health insurance, 24% under SSHI, and 11% covered by privately purchased, commercial, or other types of insurance. Similar patterns were observed among men. In terms of marital status, widowed, divorced, or separated women had higher coverage levels for any health insurance (33.9%) and SSHI (24.8%). Among men, those currently living with a partner showed higher coverage, with 35.2% for any health insurance and 22.4% for SSHI. Health insurance coverage is higher among higher education level, particularly among men. Additionally, exposure to mass media played a significant role in better coverage rates for both women and men.

The adjusted odds ratios (aOR) from the multilevel binomial logistic regression models showed the key determinants of health insurance coverage in SEAR countries among men and women aged 15–49 years (Table 3). Health insurance coverage increased with age, with individuals aged 35–49 having significantly higher odds compared to those aged 15–24 (women: aOR 1.95, 95% CI 1.92–1.98; men: aOR 1.70, 95% CI 1.60–1.81). Wealth status showed an inverse association among women, with lower odds observed in the richest quintile (aOR 0.86, 95% CI 0.84–0.88). Exposure to mass media was a strong enabler, with individuals exposed at least once a week demonstrating higher odds of coverage (women: aOR 1.25, 95% CI 1.22–1.27; men: aOR 1.30, 95% CI 1.22–1.39). For SSHI, older individuals had a higher likelihood of SSHI coverage, with those aged 35–49 showing increased odds (women: aOR 1.41, 95% CI 1.39–1.44; men: aOR 1.21, 95% CI 1.15–1.27). Wealth had a positive association, with greater odds observed in the middle-income group (women: aOR 1.14, 95% CI 1.12–1.16; men: aOR 1.21, 95% CI 1.16–1.25), and a further increase in the richest quintile for men (aOR 1.08, 95% CI 1.04–1.12). Regular exposure to mass media had a substantial impact, with those exposed at least once a week showing the highest likelihood of coverage (women: aOR 1.96, 95% CI 1.93–2.00; men: aOR 1.43, 95% CI 1.36–1.50). The country specific results for determinants of any health insurance and SSHI were presented in Supplementary Appendices 5–13.

PSU-level variance estimates for any health insurance coverage varied considerably across countries

Explanatory variables	Any health insurance				Social security health insurance			
	Women		Men		Women		Men	
	aOR (95% CI)	p-value	aOR (95% CI)	p-value	aOR (95% CI)	p-value	aOR (95% CI)	p-value
Age group		<0.001		<0.001		<0.001		<0.001
15-24 (ref.)								
25–34	1.25 (1.23–1.27)		1.23 (1.16–1.3)		1.12 (1.1–1.14)		1.03 (0.98–1.08)	
35–49	1.95 (1.92–1.98)		1.7 (1.6–1.81)		1.41 (1.39–1.44)		1.21 (1.15–1.27)	
Marital status		<0.001		<0.001		<0.001		<0.001
Never in union (ref.)								
Married/living with partner	0.83 (0.82–0.84)		1.34 (1.27–1.42)		0.82 (0.81–0.84)		1.22 (1.16–1.27)	
Widowed/divorced/separated	0.97 (0.94–0.99)		1.07 (0.92–1.24)		1.04 (1.01–1.07)		1.05 (0.93–1.19)	
Wealth quintile		<0.001		<0.001		<0.001		<0.001
Poor (ref.)								
Middle	0.94 (0.92–0.96)		1.03 (0.98–1.09)		1.14 (1.12–1.16)		1.21 (1.16–1.25)	
Rich	0.86 (0.84–0.88)		1 (0.94–1.05)		0.99 (0.97–1)		1.08 (1.04–1.12)	
Education		<0.001		<0.001		<0.001		<0.001
No education (ref.)								
Primary	0.97 (0.95–0.99)		1.02 (0.94–1.09)		0.87 (0.86–0.89)		0.87 (0.82–0.92)	
Secondary	1.01 (0.99–1.03)		1.26 (1.18–1.35)		0.74 (0.73–0.76)		0.97 (0.92–1.02)	
Higher	1.13 (1.1–1.16)		1.82 (1.68–1.97)		0.67 (0.65–0.68)		1.08 (1.02–1.15)	
Head of the household		<0.001		<0.001		<0.001		0.0003
Male (ref.)								
Female	0.93 (0.92–0.94)		1.07 (1.01–1.13)		0.92 (0.91–0.94)		0.92 (0.88–0.96)	
Exposure to mass media		<0.001		<0.001		<0.001		<0.001
Not at all (ref.)								
Less than once a week	1.15 (1.12–1.17)		1.09 (1.02–1.16)		1.56 (1.53–1.59)		1.21 (1.15–1.27)	
At least once a week	1.25 (1.22–1.27)		1.3 (1.22–1.39)		1.96 (1.93–2)		1.43 (1.36–1.5)	
Place of residence		<0.001		<0.001		<0.001		<0.001
Urban (ref.)								
Rural	1.07 (1.06–1.08)		1.15 (1.05–1.26)		1.23 (1.21–1.24)		1.25 (1.21–1.29)	

aOR: adjusted odds ratio; Level of significance for each independent variable are presented in the form of global p-value; The analytical sample for women is 829,152 and for men is 115,783.

Table 3: **Multivariate binomial regression showing the determinants of any health insurance and social security health insurance coverage in Southeast Asia Region.**

(Table 4). Among women, India exhibited the highest variance, with minimal change between the null model (52.8%) and the full model (53.1%). Bangladesh, Myanmar, and Nepal also showed high variance, with slight reductions in the full model (Bangladesh: 36.3%–35.9%, Myanmar: 40.9%–38.8%, Nepal: 40.4%–37.2%). In Indonesia, variance decreased slightly from 18.8% to 17.7%, while in the Maldives, it increased from 14.3% to 21.5%. Among men, India again showed the highest variance, remaining stable between the null model (55.9%) and the full model (56.3%). Myanmar and Nepal also recorded high variance, with Myanmar seeing a decline from 43.1% to 36.1%, while Nepal remained relatively unchanged (32.9%–32.5%). In Indonesia, variance decreased from 24.3% to 22.4%, whereas in the Maldives, it dropped from 15.6% to 10.8%. Similarly, the PSU-attributable variance pattern for social health insurance closely mirrored that of any health insurance coverage for both women and men (Supplementary Appendix 14).

Discussion

Achieving UHC remains a significant challenge for many countries, particularly those relying heavily on out-of-pocket payments for healthcare services. In the LMICs, health insurance has emerged as a primary strategy for achieving UHC goals. Our study contributes to this area and investigates the coverage of health insurance in six LMICs of SEAR utilising the analytical sample of 829,152 women from six countries and 115,783 men from five countries from the latest DHS data. The analysis presented herein yields several key findings. First, we observed considerable variation in health insurance coverage across countries, ranging from a mere 0.3% in Bangladesh to 58.2% in Indonesia among women, and from 1.4% in Myanmar to 56.6% in Indonesia among men. These findings are consistent with existing literature reflecting the diverse contexts of health financing mechanisms across the region.[3,4,20,38,39] Adverse socio-political and economic situation coupled with limited provision of health insurance in Myanmar[27] and low funding, lack of societal trust, limited information and absence historical precedence to insurance mechanisms in Bangladesh have been cited as some of the key attributers of abysmally low health insurance coverage[26] in the countries. Our study found minimal gender differences in overall health insurance coverage across SEAR. While a few studies identified higher coverage among men in India's southern states,[40] others found no consistent gender patterns.[41] Studies suggest that health financing mechanisms often lack attention to gender or other exclusion markers, such as race, caste, ethnicity, and religion, in both their design and impact.[42] Further, deep rooted societal values favouring men and gender-based discrimination in terms of access to healthcare services and finances in the region are also cited as the key attributers to the disparity.[33,43] A qualitative study in Tamil Nadu reveals that head of the household, majorly

Any health insurance

Women (aged 15–49 years)

Country	Null model		Full model		
	Variance (%)	95% CI	Variance (%)	95% CI	Number of PSUs
Bangladesh	36.3	22.97–52.11	35.9	22.36–52.30	674
India	52.8	52.20–53.26	53.1	52.56–53.62	30,161
Indonesia	18.8	17.55–20.21	17.7	16.40–18.99	1970
Maldives	14.3	9.53–20.75	21.5	9.29–49.68	266
Myanmar	40.9	30.21–52.54	38.8	28.36–50.42	441
Nepal	40.4	35.69–45.27	37.2	32.56–42.05	476
Men (aged 15–49 years)					
	Null Model		Full Model		
Bangladesh	NA	NA	NA	NA	NA
India	55.9	54.76–57.05	56.3	55.17–57.46	9100
Indonesia	24.3	21.25–27.57	22.4	19.40–25.75	1961
Maldives	15.6	10.89–21.70	10.8	6.71–16.84	266
Myanmar	43.1	29.13–58.28	36.1	22.67–52.01	440
Nepal	32.9	27.15–39.38	32.5	26.57–39.10	476

PSU: Primary sampling units; The analytical sample for women is 829,152 and for men is 115,783; Full model is adjusted with age, marital status, wealth quintile, education, head of the household, exposure to mass media, and place of residence. The reported PSU-attributable variance represents the proportion of residual variation attributable to community levels after accounting for selected demographic and socioeconomic variables. In the multilevel regression models, state/province/region levels were not included to maintain uniformity across the selected DHS countries; NA: DHS data for men was not available for Bangladesh.

Table 4: **Country-wise PSU-attributable variance in any health insurance coverage among women and men in Southeast Asia Region.**

male, plays an important part in healthcare decisions of women in the family, even if they are engaged in economic activities.[44]

Second, it is essential to differentiate between public and private health insurance and to recognise the progress made in countries with significant public health insurance schemes. Our findings showed that SSHI coverage was nearly twice as high as privately purchased health insurance at the regional level and across all countries for both genders, except in Indonesia, where the coverage of private health insurance was comparable. Over the past decades, in SEAR, Social health insurance (SHI) contributions are relatively minor in the region but growing in importance in countries such as Indonesia[17] and India.[45] Evidence suggests that the coverage of social health insurance has remarkably increased from 40 percent in 2012 to 61 percent in 2017 in Indonesia which can be considered as quite rapid, given that European countries typically took 60–70 years to expand this magnitude of coverage.[20] This rapid increase in Indonesia was experienced by the country's SSHI scheme-*Jaminan Kesehatan Nasional* (JKN).[31] Similarly, India has also made significant strides through initiatives like the Rashtriya Swasthya Bima Yojana (RSBY) and the *Ayushman Bharat Pradhan Mantri Jan Arogya Yojana* (AB-PMJAY), although gaps remain in coverage for middle-income groups.[45] Other countries in the region such as the Maldives's *Husnuvaa Aasandha*,[29] Bangladesh's *Shasthyo Surokhsha Karmasuchi* (SSK),[46] and Nepal's National Health Insurance Program (NHIP),[25] have also implemented tax-funded SSHI schemes, although challenges persist in their design and effectiveness.

While the expansion of social health insurance in these countries represents a significant step towards achieving UHC, many challenges remain particularly in the variability of SHI mechanisms across regions. In countries like in India[47] and Nepal,[48] SHI is capped by an upper financial limit, while others, like the Maldives[29] and Nepal[48] provide benefits that include both in-patient and out-patient services. Further, few countries incorporate co-payment models for services beyond the amount and population coverage.[4] Private health insurance, though present in the region, generally plays a supplementary role, primarily benefiting higher-income individuals who use it to access private hospitals or cover services beyond the basic package offered by social security schemes. For example, in the Maldives, private insurance often includes international healthcare coverage, reflecting the nation's reliance on overseas treatment for specialised services.[5] In contrast, countries like Bangladesh, Nepal, and Myanmar, have underdeveloped private health insurance markets, with coverage largely confined to affluent populations.[4] Other SEAR countries have adopted diverse health financing models. Thailand's Universal Coverage Scheme of '30 Baht' ensures near-universal access with minimal out-of-pocket costs. Sri Lanka's tax-financed system provides free public healthcare, with private insurance playing a supplementary role. Bhutan relies on public funding with limited private sector engagement, while Timor-Leste remains heavily dependent on external aid to sustain its health insurance framework.

Third, we measured the relationship between having health insurance and various independent variables (sex, age, educational attainment, exposure to mass media, head of the household, wealth quintile, and place of residence) through bi-variate and multivariate analysis. Echoing findings from earlier research conducted in Indonesia,[49] India,[30] Nepal,[50] Bangladesh,[36] and Myanmar,[27] we found that older age, higher education levels, and greater media exposure were positively correlated with insurance coverage for both men and women. Individuals in the higher age group are more likely to be employed and therefore covered under various employer-sponsored or private insurance schemes.[31] Education plays a crucial role in increasing awareness and understanding of insurance benefits, leading to higher coverage rates. Studies consistently show that higher education levels improve knowledge, making individuals more likely to enrol in health insurance schemes[36,51] Wealthier individuals, particularly men, exhibited higher coverage levels, consistent with literature reinforcing linking socioeconomic status to insurance enrolment.[52]

Fourth, we assessed the country-and community-level variations through multilevel regression to get extra power of prediction for insurance uptake beyond variation due to individual characteristics. Our study revealed that PSU-attributable variance in health insurance coverage for both men and women revealed considerable within-country disparities across SEAR countries, particularly in India for both women and men. This finding contrasts with a study conducted in India,[30] which identified that only 6% of the variation in health insurance was attributable to community-level factors. However, when analysed at the state-level, higher influence was observed, accounting for approximately 25% of the variation. This difference between in outcomes between the study can be attributed the level of analysis. In our analysis, state was not considered which may have led to a higher variation at the community level. The study by Khan and colleagues on India[30] showed that state plays an important role in explaining the variations. Further, our findings emphasise that community-level variations are key determinants of social security health insurance coverage, more so for women, highlighting the role of contextual factors in influencing health insurance subscription. These findings suggest that beyond individual determinants, contextual factors such as government commitment, the design and implementation of insurance schemes and overall economic conditions, play a crucial role in determining health insurance coverage.

Moreover, in many South Asian communities, traditional beliefs, and lack of trust in formal financial systems can hinder insurance adoption.[17] Evidence suggests that in rural areas of India,[30] Nepal[53] and Bangladesh,[36] people relied on community-based informal support systems over formal insurance, reflecting cultural preferences that affect enrolment rates.

The low coverage of health insurance in the study countries is perhaps further explained by the prevalence of informal labour markets and high poverty levels (Table 1). In Bangladesh and India, for example, informal workers often prioritise immediate financial needs over health insurance, limiting their participation in health insurance schemes that do not account for their economic realities.[54] This reliance on informal employment also creates challenges for premium-based models of health insurance coverage.[49,54,55] International evidence has shown that enrolling, retaining, and collecting premiums from informal sector workers remains a major challenge.[39,52] In addition to that, functioning of health system also influence the uptake of health insurance as effective health insurance is reliant on the availability of healthcare services.

The value of purchasing health care through Government funded health insurance scheme (GFHIS) is that government money can be used to purchase services from the private sector. Where private sector does not exist, it may be better to use government money to build those services. Otherwise, financial allocation will be made but not utilised depriving the state of investments which would have been more effective in improving the health of the people. In countries such as Myanmar and parts of Bangladesh where health infrastructure is underdeveloped, limited access to care reduces the perceived value of insurance.[27,56] For instance, in 2017, the Government of Bangladesh piloted SSK in one district with plan for scaleup. However, the utilisation rate was very low with underutilisation fund was 5% in initial years which was increased to 22% of the fund and returned. Therefore, this becomes a challenge for the Ministry of Health to seek more funds from the Ministry of Finance for health insurance.[56] Similarly, in the Maldives, geographical constraints related to its archipelagic nature impede health insurance uptake. Nepal faces several challenges that hinder the growth of its National Health Insurance Program, including limited risk pooling, stagnant financing, and the absence of robust financial sustainability assessments. Other contributing factors are the insufficient local-level empanelment of health facilities, limited digitalisation of NHIP functions, weak capacity of the Health Insurance Board (HIB), an outdated benefit package, and insufficient government ownership in strengthening the program. These issues are likely key reasons for the low insurance uptake in the country.[25] In contrast to neighbouring countries like Thailand, Vietnam, and India, Myanmar's government spending on healthcare is relatively lower. Currently, the only form of health insurance available in Myanmar is the Social Security Scheme (SSS), administered by the Ministry of Labour, which has limited eligibility.[27]

Our estimates rely on the most recent DHS conducted between 2015 and 16 to 2022. Consequently, data were not collected in the same year across countries, and our findings should therefore be interpreted as pertaining to the specific survey year for each country, rather than as current estimates. Also, while the WHO classifies SEAR as comprising 11 countries, we included only six due to the availability of DHS data. Data for men in Bangladesh was not available, so Bangladesh was excluded from the men's analysis. Furthermore, the analysis was restricted to individuals aged 15–49, which limited our ability to assess insurance coverage among older adults and children. We also did not estimate the effects of insurance coverage on health outcomes, healthcare utilisation, or healthcare payments. These are critical factors in understanding the determinants of health insurance. Another limitation was that our analysis was based on multiple countries, restricting us to variables common across all of them. As a result, certain country-specific variables, which were important determinants of health insurance coverage, could not be included. Furthermore, the over-representation of India in terms of sample size and number of PSUs might have influenced the overall findings, posing another potential limitation. Finally, the cross-sectional nature of DHS data restricts our ability to make causal inferences and self-reported, may be prone to recall and social desirability biases.

In conclusion, this study provides distinct empirical evidence with important policy implications. Our finding of overall low levels of health insurance coverage and high variability across the SEAR countries reflect varying national strategies toward achieving UHC. For example, findings in Nepal and Bangladesh can guide health system redesign efforts aimed at bridging coverage gaps, particularly among women and rural populations. In India, while schemes like AB-PMJAY offer SHI to economically weaker sections, a significant portion of the middle-income population remains uninsured. In eight of the eleven SEAR countries, private health insurance premiums are subject to government-imposed taxes, with exceptions being Bhutan and Timor-Leste (Table 1). These taxes place a considerable financial burden on middle-income populations, often referred to as the 'missing middle.'[57] This group is typically not covered by government-subsidised schemes and struggles to afford high premiums of private insurance. Reducing or removing taxes on health insurance premiums could improve affordability, increase accessibility for this population, and potentially lead to higher subscription rates, thereby enhancing financial protection against

health-related expenses. Overall, this study highlights the importance of addressing country-specific contexts to effectively expand health insurance coverage. Policies should prioritise building sustainable health financing systems, strengthening the resilience of healthcare infrastructures, and fostering widespread community awareness about the benefits of health insurance. Tailored strategies that address socioeconomic disparities and specifically target underinsured populations, including the rural poor and the missing middle, are vital for advancing equitable health insurance access and accelerating progress towards UHC.

Contributors

NKS and NS contributed to the project administration. NKS and SKS conceptualise and design the study. NS, RB, SKS and RPSG support to the study design, data extraction, formal analysis, interpretation, writing of the original draft. NKS, PJ, and SKS contributed to data assembly, preparation and data validation. NS, RS, and PJ contributed to interpretation and critical revision of the manuscript. NKS, SKS and NS had access to, and verified the data. NS and RS also contributed equally and are co-senior authors. All authors read and approved the final version and had final responsibility for the decision to submit for publication.

Data sharing statement

The datasets used in this study are available on request from the DHS Program (https://dhsprogram.com/data/available-datasets.cfm).

Declaration of interests

We declare no competing interests. The views expressed in this article are those of the authors and do not necessarily represent the policies, positions, or opinions of the National Health Authority (NHA).

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Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.lansea.2025.100634.

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