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RESEARCH ARTICLE



Hypertension prevalence in the Asia-Pacific region: a systematic analysis of population-based studies

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ABSTRACT

Background: A large proportion of the world population lives in the Asia-Pacific region where uncontrolled hypertension impacts global trends. This study aimed to summarise age-adjusted prevalence estimates of hypertension in the region to project the future burden of the disease to 2030.

Methods: A comprehensive literature search was conducted using PubMed®, Web of Science®, SCOPUS®, and Embase®, alongside manual reference reviews, to identify studies from 2001 to 2023 in the Asia-Pacific region. Inclusion criteria required standardised blood pressure measurement, population-based data, and definitions of hypertension as systolic and diastolic $\geq 140/90$ mmHg, or antihypertensive use. The hypertension prevalence was determined based on the identified studies. Within countries, the linear regression of age-standardised prevalence estimates predicted trends in hypertension prevalence to 2030.

Results: 285 population-based studies were included. Age-specific and crude hypertension prevalence estimates from 19 countries were used to estimate predicted values. The estimated age-standardised prevalence of hypertension in 2030 ranged from 11.0% to 46.2% and was projected to increase in most countries. The exceptions were Iran, Nepal, and Mongolia, which were estimated to achieve 30% reduction in hypertension relative to 2010. Six countries were estimated to have reductions in prevalence by 2030, but without achieving the WHO goal of 30% reduction relative to 2010.

Conclusion: The hypertension prevalence has been increasing in most countries. Only three countries are projected to achieve their target goal by 2030. Initiatives to strengthen primary prevention and treatment, along with consistent measurement of population blood pressure in this region, should remain important agenda items for policy makers.

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Introduction

In 2021, hypertension became the leading risk factor for death and disability (GBD Risk Factors Collaborators, 2024; Li et al., 2025). It was estimated to result in 214.5 million life years lost, measured in disability-adjusted life years (DALYs), and contributed to an estimated 10.4 million avoidable deaths annually (Li et al., 2025). Hypertension accounts for over 50% of heart disease, stroke, and chronic kidney disease related deaths (Forouzanfar et al., 2017). Suboptimal blood pressure control is estimated to lead to 10% of global healthcare spending. This proportion reaches 25% of healthcare spending in Eastern Europe and Central Asia. Importantly, improved blood pressure control could save nearly \$100 billion in healthcare expenditure over a 10-year period (Gaziano et al., 2009).

Globally, the estimated age-standardised prevalence of hypertension changed slightly from 1990 to 2019, increasing from 32% to 33% (NCD Risk Factor Collaboration, 2021; World Health Organization, 2023a). The prevalence declined in high-income countries and the WHO European region, while there were slight to moderate increases in the Western Pacific region and South-East Asia. However, the absolute number of people with hypertension increased to 1.3 billion in 2019 due to population growth and aging, 82% of people with hypertension live in low-income and middle-income countries. The greatest number of people with hypertension live in the most populous WHO regions of the Western Pacific Region and South-East Asia (NCD Risk Factor Collaboration, 2021).

Approximately 60% of the global population lives in the Asia-Pacific region; thus, uncontrolled blood pressure in this region has an important impact on current and future global trends (United Nations & Economic and Social Commission for Asia and the Pacific (ESCAP), 2023). Two recent studies published in 2019 updated the prevalence of hypertension including studies conducted in countries in the Asia-Pacific region. One study included 14 Asia-Pacific countries and estimated the highest prevalence of hypertension was in Russia (64.1%) and the lowest in India (13.3%) (Geldsetzer et al., 2019). The other study included 50 countries from the Asia-Pacific region and estimated the prevalence of hypertension in 2019. The prevalence of hypertension ranged from 40.2% to 46.2% in Central Asia, 25.4% to 45.6% in East and Southeast Asia, and 26.3% to 50.8% in the Pacific region (NCD Risk Factor Collaboration, 2021). While these studies provide important evidence on the burden of hypertension in this region, understanding trends in the prevalence of the disease over time is necessary to evaluate policies and health system interventions aimed at reducing the burden of hypertension in these countries.

The decline in raised blood pressure from 29% in 2010 to 26% in 2019 was not sufficient to achieve the global target of a hypertension prevalence of 21% by 2025 (World Health Organization, 2023a). With an extension to achieve the Sustainable Development Goals target 3.4, the World Heart Federation (WHF) set a target to reduce the prevalence of hypertension by 30% by 2030 relative to 2015 levels (Jeemon et al., 2021). In order to monitor the progress towards this goal, it is crucial to understand the longitudinal estimates of hypertension within countries.

Regional studies have improved the understanding of hypertension prevalence across individual countries, yet they often rely on cross-sectional data and focus on single-country estimates. Although the two aforementioned studies have examined trends in prevalence, none have comprehensively assessed hypertension projections across multiple Asia-Pacific countries. The lack of contemporary, region-specific predictive models makes it difficult to evaluate progress towards achieving the WHO's goal of a 30% reduction in hypertension prevalence by 2030. There remains a critical need for studies that incorporate recent data and prediction models to assess long-term hypertension trends and inform targeted public health interventions. Thus, our goal was to identify estimates of the reported prevalence of hypertension among countries in the Asia-Pacific region over time and use these data to project age-adjusted prevalence rates for 2030.

Methods

This study was approved by the Ethics Committee of Mahasarakham University on 2 April 2024 [no.198-104/2567].

A comprehensive literature search was performed using four databases: PubMed®, Web of Science®, SCOPUS®, and Embase®. Additional studies were identified by manual searches of references cited in the original studies, and reviews. Search terms were developed based on previous studies (Mills et al., 2016;

NCD Risk Factor Collaboration, 2021). Search strategies are described in [Supplemental Table S1](#). No date or language restrictions were applied. Additional studies were identified by a manual review of references cited in reviews, meta-analyses, and original studies. Country-specific searches of the WHO STEP wise approach to surveillance (STEPS) surveys, and the Demographic Health Survey (DHS) were also conducted. Publications in other languages were translated into English. Study selection and data abstraction were conducted independently by 14 researchers using a standardised protocol and data-collection form, with discrepancies resolved through consensus. All data sources were carefully reviewed to ensure that they met the inclusion criteria. All stages of data extraction followed the Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) Flow diagram. All data entry was double-checked by one member of the research team (PSO).

The eligibility criteria for inclusion were as follows: (1) studies published from 1 January 2001 to 31 December 2023, (2) population-based cross-sectional survey, (3) standardised blood pressure measurement methods, (4) hypertension defined as an average systolic blood pressure of 140 mm Hg or greater, average diastolic blood pressure of 90 mm Hg or greater, and/or use of antihypertensive medication, and (5) studies performed in the Asia-Pacific region. Exclusion criteria were: (1) non-population-based studies or studies with a study population of less than 100 participants, (2) studies conducted only among minority ethnic groups or specific educational, occupational, or other socioeconomic groups, (3) studies assessing hypertension in patients with other diseases (e.g. hypertension awareness in people with diabetes), high-risk populations (e.g. hypertension control in smokers), (4) studies in patients with existing hypertension (e.g. controlled rate from treatment), and (5) studies performed in a single sex or studies not covering ages from 35 to 60 years at a minimum. If there were multiple studies from the same country in the same year, the study with the largest sample size was included. For the hypertension prevalence analysis, only studies reporting age group-specific prevalence were included. The primary outcome measure was the prevalence of hypertension. Hypertension was defined as a systolic blood pressure of 140 mmHg or greater or taking medication for hypertension.

Statistical analysis

Data from countries where a minimum of three surveys conducted between 2001 and 2023 were available were included. For the hypertension prevalence analysis, the age-standardised prevalence of hypertension was estimated within countries. Standardisation was performed using the country-specific age distribution from 2022 as reported in the International Database of the United States Census Bureau (United States Census Bureau, 2025). Confidence intervals for the prevalence estimates were calculated based on the total sample size of each study, assuming a normal distribution.

Using the study-specific prevalence estimates, linear regression was performed to predict prevalence estimates for different years up to 2030. To estimate the uncertainty of the point estimate, regression was conducted on bootstrapped samples derived from the yearly estimates, where bootstrapping involved selecting values for each study within the confidence interval of the estimates. A total of 1,000 bootstrapping iterations were conducted to generate uncertainty estimates for the predictions. All statistical analyses were performed using R version 4.4.0 (R Core Team, 2024).

In the primary analysis, studies were excluded from use in the prediction estimate if their prevalence estimates fell outside 10 percentage points of the median prevalence estimate from studies in the same country. This step was performed to eliminate the influence of outliers on predicted prevalence estimates. Additionally, a sensitivity analysis was conducted to examine the impact of the study selection criteria: (1) including all studies and (2) excluding studies with prevalence estimates exceeding 20 percentage points above or below the country-specific median prevalence estimate, as shown in [Supplemental Table S2](#).

Results

There were 7,326 titles identified by keywords, and 556 full-text studies were assessed for eligibility. The final number of studies included was 159. Records identified from the DHS, STEPS, and citation searches were 226. Of these, 138 reports and studies were assessed and included in the study. A total of 285 studies were included in this review, as shown in [Figure 1](#). The characteristics of the 285 studies are summarised in [Supplemental Tables S3–S7](#).

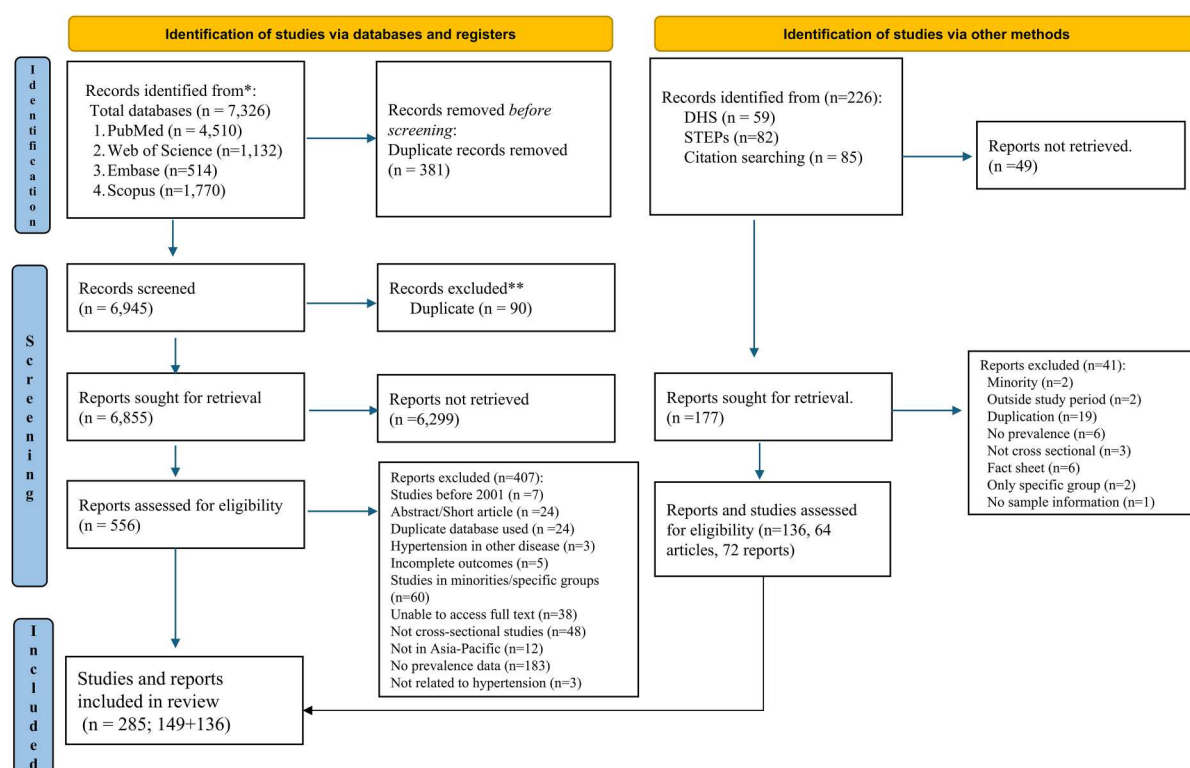


Figure 1. PRISMA 2020 flow diagram for systematic review to include searches of databases and other sources.

Prevalence of hypertension from published studies in 19 countries from Asia-Pacific region

A total of 50 out of 55 countries had sufficient information on the prevalence of hypertension, as shown in [Supplemental Table S8](#). Published articles on the prevalence of hypertension in these five countries could not be found or accessed (Japan, Democratic Peoples' Republic of Korea, Guam, Northern Mariana Islands, and Tuvalu). Of the 50 countries, only 19 provided sufficient data for inclusion in the hypertension prevalence projection analyses. The descriptive characteristics of the most contemporary studies included with prevalence of hypertension in 19 countries are presented in [Table 1](#). Most studies reported the prevalence of hypertension based on at least two blood pressure measurements, except for New Zealand, which used a self-reported questionnaire. The most recent estimates were from 2015 or later in the majority of countries, with only four countries providing information older than 2015.

Age-standardised estimated prevalence of hypertension

In 2030, 14 countries (73.7%) were projected to have the estimated age-standardised prevalence of hypertension over 20%, with five countries falling below this threshold (Mongolia [18.0, 95% CI 16.1–20.0], Islamic Republic of Iran [13.5%, 95%CI 12.5–14.7], Nepal [11.0%, 95%CI 8.7–13.3], Philippines [17.0%, 95%CI 15.8–18.2], New Zealand [17.0%, 11.3–22.9]). The range of estimated age-standardised prevalence of hypertension ranged from 11.0% (95% CI 8.7–13.3) to 46.2% (95%CI 44.1–48.3) ([Table 2](#)).

[Table 2](#) contains the estimates of the percentage change in hypertension prevalence for each country. All the estimates for 2010, 2015, 2025 and 2030 projections were derived from fitted regression lines (Figure S1–S19). The highest percentage of incline was estimated in Bangladesh. The prevalence of hypertension was estimated to achieve the goals in three countries by 2030 relative to 2010 and 2015, respectively – Mongolia (–47.6% and –40.5% change), the Islamic Republic of Iran (–44.4% and –37.4% change), and Nepal (–63.4% and –56.6% change). There were six countries expecting relative reduction but without achieving the goals, including the Republic of Korea (–9.0% and –7.0% change), Turkey (–10.8% and –8.3% changes), Malaysia (–6.2% and –4.7% change), Philippines (–27.8% and –22.4% change), New Zealand (–21.1% and –16.7% change), and Fiji (–5.9% and –4.5% change).

Table 1. Survey characteristics of the 19 countries in the Asia-Pacific region.

	Data-year	Level of representativeness	Database used	Rural, urban or both	Sample size	Age, years	Prevalence of hypertension (%)	Response rate, %	BP method		
									Device	Measures/visits (n)	Preparation
Northeast Asia											
1. China(Liu et al., 2020)	2019	Local	8 cities in South China	Both	27483	35–75	42.4	N/A	Electronic sphygmomanometer	3	5-min rest in a seated position; measuring right arm; 30-second interval
2. Mongolia(Pengpid & Peltzer, 2022)	2019	National	STEPS	Both	6585	≥15	23.2	98.1	Digital automated BPM	3	15-min seated rest, 3-min interval.
3. Republic of Korea (Lee et al., 2023)	2021	National	KNHANES	Both	5595	≥19	28.1	N/A	Mercury sphygmomanometer	2–3	5-min seated position
South Asia											
4. Bangladesh (Geldsetzer et al., 2022)	2019-2020	National	Chakaria surveillance system	Both	838	≥18	25.2	82.0	Automatic BP monitor	2	Sitting position, 1-min interval.
5. Bhutan (Department of Public Health Ministry of Health, 2020)	2019	National	STEPS	Both	5516	15–69	28.0	99.0	Digital automated BP monitor	3	5-min rest, 5-min interval, proper cuff size.
6. India (Singh et al., 2023)	2023	Local	Community-based study in the Northeast of Delhi	Both	8850	≥18	28.6	97.0	Automatic BP monitor	3	5-min rest, 5-min interval
7. Islamic Republic of Iran (Sadeghi et al., 2021)	2016-2018	Local	A large city	Both	30424	20–65	15.8	N/A	Mercury sphygmomanometres	2	Sitting position, 10-min rest, 10-min interval
8. Nepal (Ministry of Health and Population (Nepal,2023)	2022	National	DHS	Both	10097	≥15	20.1	96.0 urban 97.0 rural	Automatic digital BP monitor	3	5-min interval
9. Pakistan (Memon et al., 2022)	2019	National	MMM	Both	6919	≥18	52.1	N/A	Digital BP monitor	3	Sitting position, 5-min interval
10. Sri Lanka (Ministry of Health and Department of Census and Statistics, 2021)	2021	National	STEPS	Both	6267	18–69	32.6	90.0	Automatic digital BP monitor	3	Resting and seated position.
11. Turkey (World Health Organization, 2018)	2017	National	STEPS	Both	6053	≥15	33.9	92.3	N/A	3	15-min rest, 3-min interval
Southeast Asia											
12. Indonesia (Defianna et al., 2021)	2018	National	SHDSS	Both	4328	≥ 18	39.4	N/A	Digital automatic BP monitor	3	Sitting position after rest for 15 min
	2019	National	NIH	Both	4056	≥18	30.0	87.2	Digital BP monitor	3	N/A
(Continued)											

(Continued)

Table 1. Continued.

Data-year	Level of representativeness	Database used	Rural, urban or both	Sample size	Age, years	Prevalence of hypertension (%)	Response rate, %	BP method		
								Device	Measures/visits (n)	Preparation
13. Malaysia (National Institutes of Health (NIH), 2019)	2014	National	Both	8483	25–64	26.4	91	Automatic digital BP monitor	3	15-min rest, no crossed legs, 5-min interval
14. Myanmar (Latt et al., 2014)	2021	National	Both	3438	≥ 19	37.0	N/A	Automatic digital BP monitor	3	5-min seated, with back supported, legs uncrossed and arm at heart level
15. Philippines (Sison et al., 2021)	2019–2020	National	Both	22518	≥ 15	25.4	N/A	Digital automatic BP monitor	3	1-min interval, 5-min seated, sitting position, at heart level, BHS guideline
16. Thailand (Aekplakorn, 2021)	2019	National	N/A	2203	18–69	33.8	95.6	Manual aneroid sphygmomanometer	3	10-min rest, right arm used, sitting position, 30-sec interval.
Pacific region										
18. Fiji (Gyaneshwar et al., 2016)	2012	Local	N/A	2675	25–64	31.1	72.7	STEP protocol	N/A	N/A
19. New Zealand (Ministry of Health, 2012)	2011/12	National	Both	12370	≥ 15	15.8	78.0	Self-reported questionnaire	N/A	N/A

Note: DHS: Demographic and Health Survey; KNHANES: Korea National Health and Nutrition Examination Survey; MMM: May Measurement Month; NIH: National Institute of Health; NHS: National Health Survey; NZHS: New Zealand Health Survey; PRESYON-4: Philippine Heart Association – Council on Hypertension Report on Survey of Hypertension in 2021; STEPS: World Health Organization STEPwise approach to noncommunicable disease risk factor surveillance; SHDSS: Sleman Demographic and Surveillance System; N/A: not applicable.

Table 2. Estimated age-standardised prevalence of hypertension in 2010, 2015, 2025, and 2030.

Country	2010 Prevalence (95%CI)	2015 Prevalence (95% CI)	2025 Prevalence (95% CI)	2030 Prevalence (95% CI)	2010–25 % change	2010–30 % change	2015–30 % change
Northeast Asia							
1. China (included Hong Kong, Taiwan, Tibet)	32.4 (32.2–32.5)	34.2 (34.0–34.4)	37.7 (37.3–38.2)	39.5 (38.9–40.1)	16.4	21.9	15.6
2. Mongolia	34.4 (33.7–35.1)	30.3 (29.8–30.9)	22.1 (20.7–23.5)	18.0 (16.1–20.0)	–35.7	–47.6	–40.5
3. Republic of Korea	29.9 (29.5–30.3)	29.2 (28.8–29.6)	27.8 (27.0–28.6)	27.16 (26.1–28.2)	–6.8	–9.0	–7.0
South Asia							
4. Bangladesh	18.7 (18.1–19.3)	25.6 (25.1–26.0)	39.3 (37.9–40.8)	46.2 (44.1–48.3)	109.8	149.5	80.4
5. Bhutan	23.5 (22.3–27.7)	27.4 (26.6–28.3)	35.3 (33.1–37.4)	39.2 (36.2–42.2)	49.9	66.6	42.8
6. India	30.3 (29.6–30.9)	31.5 (31.0–32.0)	34.1 (33.1–35.0)	35.4 (34.1–36.6)	12.7	16.9	12.1
7. Islamic Republic of Iran	24.3 (23.9–25.6)	21.6 (21.3–21.9)	16.2 (15.4–17.0)	13.5 (12.5–14.7)	–33.2	–44.4	–37.4
8. Nepal	30.0 (28.3–31.7)	25.2 (24.3–26.1)	15.7 (14.3–17.1)	11.0 (8.7–13.3)	–47.6	–63.4	–56.6
9. Pakistan	33.1 (32.1–34.1)	36.1 (35.2–37.1)	42.2 (38.9–45.7)	45.3 (40.7–50.1)	27.7	37.0	25.4
10. Sri Lanka	28.0 (27.2–28.8)	29.4 (28.8–30.0)	32.0 (30.7–33.4)	33.3 (31.4–35.2)	14.0	18.7	13.4
11. Turkey	31.1 (30.2–32.1)	30.3 (29.5–31.1)	28.6 (26.2–31.1)	27.7 (24.4–31.2)	–8.1	–10.8	–8.3
Southeast Asia							
12. Indonesia	29.5 (29.0–30.1)	32.6 (32.0–33.1)	38.7 (37.5–39.8)	41.7 (40.2–43.1)	31.0	41.2	28.0
13. Malaysia	35.7 (35.3–36.0)	35.1 (34.8–35.4)	34.0 (33.3–34.7)	33.5 (32.5–34.4)	–4.7	–6.2	–4.7
14. Myanmar	27.2 (26.7–27.8)	27.7 (26.7–28.7)	28.5 (26.4–30.7)	28.9 (26.1–31.8)	4.7	6.2	4.6
15. Philippines	23.6 (23.1–24.0)	21.9 (21.5–22.3)	18.7 (17.8–19.5)	17.0 (15.8–18.2)	–20.8	–27.8	–22.4
16. Thailand	25.6 (24.9–26.3)	26.7 (26.0–27.4)	29.0 (27.4–30.8)	30.2 (27.9–32.6)	9.6	18.0	12.9
17. Viet Nam	22.2 (21.7–22.7)	24.2 (23.2–25.1)	28.1 (25.9–30.4)	30.0 (27.3–33.0)	26.3	35.0	24.2
Pacific							
18. Fiji	30.0 (29.1–30.9)	29.6 (28.4–30.8)	28.7 (26.7–31.0)	28.2 (25.7–31.1)	–4.4	–5.9	–4.5
19. New Zealand	21.6 (20.9–22.2)	20.4 (18.9–22.0)	18.1 (13.9–22.6)	17.0 (11.3–22.9)	–15.8	–21.1	–16.7

Discussion

A key contribution of this study was the estimation of hypertension prevalence across multiple countries using a standardised method, filling a critical gap in hypertension prevalence forecasting in the region. Findings indicate that while Iran, Nepal, and Mongolia may achieve the WHO's 30% reduction target, most countries will see rising hypertension rates based on the trajectory of estimates published in the peer-reviewed literature. Six countries (South Korea, Turkey, Malaysia, the Philippines, New Zealand, and Fiji) are expected to see relative reductions but still miss the global target.

The strength of this study was its comprehensive and contemporary assessment of hypertension prevalence across the Asia-Pacific region. By systematically analysing 285 population-based studies from 50 countries, we incorporated data from 2001 to 2023 and applied predictive modelling to estimate hypertension prevalence in 2030. Unlike previous studies that provided only cross-sectional prevalence estimates or lacked long-term forecasting, this study evaluated the likelihood of countries meeting the WHO's 30% reduction target by 2030. By integrating systematic review methods with predictive modelling, our approach offered policymakers data-driven insights to design proactive public health strategies.

A 2005 projection estimated the global hypertension prevalence would rise from 26.4% (95%CI 26.0–26.8%) in 2000 to 29.2% (95%CI 28.8–29.7%) by 2025, with country-specific estimates for India (22.9% to 23.6%) and China (27.0–27.7% in China) (Kearney et al., 2005). In contrast, our 2025 age-standardised projections are higher for both India (34.1%, 95%CI 33.12–35.0) and China (37.71%, 95%CI 37.3–38.2). These

findings confirmed that earlier projections which assumed constant age- and sex-specific prevalence likely underestimated the growing burden of hypertension.

Our findings suggested that Nepal, the Islamic Republic of Iran, and Mongolia were projected to decrease the prevalence of hypertension by 30% by 2030 relative to 2015 levels. In addition, two more countries, the Philippines and New Zealand, are projected to have a prevalence of hypertension lower than 21% by 2025. Compared to the success in hypertension control in Cuba, all these countries had a prevalence of hypertension below 20%, similar to Cuba, which achieved this through a well-organised primary care system that was strengthened and supported despite operating in a low-resource setting (Orduñez-García et al., 2006).

In Nepal, the WHO reported a prevalence of hypertension of 24.5% in 2019. A study showed the prevalence of hypertension screening was 65.9% (95%CI 62.2–69.5) in the 15- to 69-year-old population (Dhungana et al., 2022). While one meta-analysis suggested a rise from 26% (19–33%) during 2000–2005 to 32% (23–40%) during 2016–2020, more than 50% of its included studies were rated as fair quality (Dhungana et al., 2021). Conversely, STEPS surveys indicated a downward trend from 25.7% in 2013 (Aryal et al., 2014) to 24.5% in 2019 (Dhimal et al., 2020) and recent DHS report from 2022 revealed the prevalence dropping to 19.3%, aligning with this study's findings.

In the Islamic Republic of Iran, Sepanlou et al. pooled studies from 1990 to 2016 and reported that the age-standardised prevalence of hypertension increased from 8.7% to 28.8%, an increase of 1.9 fold, in women, and from 8.0% to 24.2%, an increase of 1.87 fold, in men, concluding that 2030 target would not be met. Conversely, our results projected a 37.4% reduction in prevalence by 2030, thereby meeting the target goal. These discrepancies likely stem from: (1) our study recruited more recent data through 2018, reporting the prevalence of hypertension at 15.8% (Sadeghi et al., 2021); (2) the previous study included several studies focusing on elderly populations (Sepanlou et al., 2021), which may have raised their pooled prevalence compared to our study, which excluded those groups; (3) the standardisation techniques differed. While the previous study adjusted for sex, age, province, and year of schooling, wealth index, and urbanisation, our study utilised age standardisation based on the 2022 country-specific age distribution.

In Mongolia, NCD RisC and WHO reported high prevalences of hypertension at 40.7% and 43.0% among adults, respectively (NCD Risk Factor Collaboration, 2021; World Health Organization, 2023b). Conversely, our study projected a lower prevalence of 27.0% in 2019, aligning with Pengpid et al. who observed a decreasing trend in hypertension prevalence among adults from 28.4% in 2005 to 23.2% in 2019 (Pengpid & Peltzer, 2022). The differences likely stem from differing data sources; the NCD RisC included the older National Nutrition Survey (1999), which primarily assessed glucose tolerance, while our study included an additional study by Potts et al., which focused specifically on hypertension (Potts et al., 2020). In addition to the declining trend in hypertension prevalence, Mongolia also demonstrated a hypertension awareness rate of 53.0%, a treatment rate of 31.5% and a control rate among treated of 52.9% (Pengpid & Peltzer, 2022). A traditional habit of drinking salty tea, which was recommended to be limited in 2009 (Ariunaa et al., 2009), may have changed in subsequent years and contributed positively to those outcomes.

Hypertension remains a major risk factor for rising cardiovascular diseases in the Asia-Pacific region. In line with global targets to reduce hypertension by 2025 and 2030, our study supports existing evidence that the majority of countries in this region are unlikely to meet these goals. These findings highlight the urgent prioritisation of prevention and control strategies. Although population-based national surveys, conducted at least every five years, are essential for monitoring trends in risk factors and NCDs, such surveys have not been conducted in most countries across the region (Sepanlou et al., 2021). Furthermore, hypertension registries have not been widely utilised across the globe (O'Brien, 2017b), despite the fact that well-designed and well-performed patient registries can provide real-world outcomes to fill the evidence gaps (Gliklich et al., 2014; O'Brien, 2017a). A strong primary care system that uses an evidence-based approach, in collaboration with governments, non-governmental organisations, and local communities, is crucial for supporting prevention policies and programmes, including general health checks (Liss et al., 2021) and community-accessible screening services such as mobile units and community pharmacies (Asayut et al., 2018; Fleming et al., 2015). These initiatives should aim to raise public awareness, educate healthcare providers, and reduce modifiable risk factors such as high salt intake, smoking, alcohol consumption, diabetes, and obesity (Ibrahim & Damasceno, 2012; World Health Organization, 2023a). Beyond screening, strengthening hypertension management involves enhancing medication access and improving patient adherence. Current evidence suggests prioritising the involvement of pharmacists and community health workers (Mills et al.,

2024), supporting research, development of knowledge, technology and tools for assessing hypertension and other risk factors.

This study has several limitations. First, this study did not limit the use of probabilistic sampling, which might affect the representativeness of the findings for individual countries. However, all included studies were population-based; for example, the May Measurement Month initiative recruited over 6,000 participants across at least four regions per country. Second, data accessibility and quality varied across sources. Several countries lacked updated WHO STEPS reports compared to the NCD-RisC data, while others (e.g. Japan, Singapore) omitted critical details such as hypertension prevalence or sample size. Furthermore, inconsistent reporting formats such as reporting hypertension awareness using either the number of participants or the number of individuals with hypertension as the denominator. Moreover, many research reports have provided limited outcome data, such as lack of blood pressure control. Consequently, projections for hypertension awareness, treatment, and control could not be performed as originally planned. Third, some countries had a limited number of surveys conducted during the study period, which restricted the ability to perform projections. Fourth, for large countries like India and China, regional variations in hypertension prevalence are substantial. Consequently, the available data may not be fully representative, and this regional heterogeneity could compromise the reliability of national projections. Fifth, studies with prevalence estimates deviating $\pm 20\%$ from the country-specific median estimates were excluded from the prediction modelling step to reduce the influence of outliers on regression estimates. The rationale was two folds; (1) within defined study period, large deviations from the country median are unlikely to reflect true population-level variation and more plausibly result from studies conducted in geographically restricted samples; and (2) including such extreme estimates in linear regression modelling could distort country-level prevalence projections. Sixth, the effect of different methods used for blood measurements (e.g. digital metres, sphygmomanometres) and measurement settings (e.g. communities, health centres, or events) in each survey may affect the prediction estimates with multiple measurements, and different standardisation (NCD Risk Factor Collaboration, 2021). Finally, due to variability in prevalence reporting, and limited data from individual studies, age was used for standardisation within individual countries. Because of the differences in study populations, standardisation for comparing prevalence across countries was not performed.

Nevertheless, utilising both retrospective and predictive modelling allows for more effective, proactive strategies to reduce the burden of hypertension. Future research is essential to refine these models as more robust data become available.

Conclusion

The updated prevalence of hypertension continues to increase in the Asia-Pacific region. The majority were estimated to be unable to achieve the target goal by 2025 or 2030. We urge policy makers to strongly prioritise health policies to strengthen primary prevention and treatment with comprehensive data to improve the health of people in this region.

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Availability of data and materials

The data that support the findings of this study are available on request from the corresponding author.

Ethics approval and consent to participate

The ethics committee of Mahasarakham University approved the study (approval number 198-104/2567).

Declaration of generative AI use

Copilot and Gemini were used only for language editing to improve grammar and readability. They were not used for data analysis, data interpretation, or drawing conclusions. The authors take full responsibility for the accuracy, integrity, and final content of the manuscript.

Consent for publication

Not applicable.

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References

- Aekplakorn, W., (Ed.). (2021). *The 6th Thai national health examination survey, 2019–2020*. Faculty of Medicine Ramathibodi Hospital, Mahidol University.
- Ariunaa, T., Perico, N., Baigalma, E., Naranulzi, S., Munkhdelger, J., Enkhtuya, J., Niamsuren, P., Carminati, S., Ene-Iordache, B., Remuzzi, G., Soninkhu, B., Byambadash, B., & Gelegjamts, K. H. (2009). Salty tea intake and hypertension in Mongolia. *International Journal of Cardiology*, 137(Suppl. 1), S54. <https://doi.org/10.1016/j.ijcard.2009.09.180>.
- Aryal, K. K., Neupane, S., Mehata, S., Vaidya, A., Singh, S., Paulin, F., Madanlal, R. G., Riley, L. M., Cowan, M., Guthold, R., Singh, S. P., Bhushal, C. L., & Lohani, G. R. (2014). *Noncommunicable diseases risk factors: STEPS Survey Nepal 2013*. Nepal Health Research Council.
- Asayut, N., Sookaneknun, P., Chaayasong, S., & Saramunee, K. (2018). Outcomes : Costs and stakeholders' perspectives associated with the incorporation of community pharmacy services into the National Health Insurance System in Thailand: A systematic review. *International Journal of Pharmacy Practice*, 26(1), 16–27. <https://doi.org/10.1111/ijpp.12385>
- Defianna, S. R., Santosa, A., Probandari, A., & Dewi, F. S. T. (2021). Gender differences in prevalence and risk factors for hypertension among adult populations: A cross-sectional study in Indonesia. *International Journal of Environmental Research and Public Health*, 18(12), 6259. <https://doi.org/10.3390/ijerph18126259>.
- Department of Public Health Ministry of Health. (2020). *Noncommunicable disease risk factors: Bhutan STEPS survey report, 2019*. Department of Public Health, Ministry of Health Royal Government of Bhutan, Royal Government of Bhutan, World Health Organization.
- Dhimal, M., Bista, B., Bhattarai, S., Dixit, L. P., Hyder, M. K. A., Agrawal, N., Rani, M., & Jha, A. K. (2020). *Report of noncommunicable disease risk factors: STEPS survey Nepal 2019*. Nepal Health Research Council.
- Dhungana, R. R., Pandey, A. R., & Shrestha, N. (2021). Trends in the prevalence: Awareness, treatment, and control of hypertension in Nepal between 2000 and 2025: A systematic review and meta-analysis. *International Journal of Hypertension*, 2021, 6610649. <https://doi.org/10.1155/2021/6610649>
- Dhungana, R. R., Pedisic, Z., Dhimal, M., Bista, B., & de Courten, M. (2022). Hypertension screening, awareness: Treatment, and control: A study of their prevalence and associated factors in a nationally representative sample from Nepal. *Global Health Action*, 15(1), 2000092. <https://doi.org/10.1080/16549716.2021.2000092>
- Fleming, S., Atherton, H., McCartney, D., Hodgkinson, J., Greenfield, S., Hobbs, F. D., Mant, J., McManus, R. J., Thompson, M., Ward, A., & Heneghan, C. (2015). Self-screening and non-physician screening for hypertension in communities: A systematic review. *American Journal of Hypertension*, 28(11), 1316–1324. <https://doi.org/10.1093/ajh/hpv029>.
- Forouzanfar, M. H., Liu, P., Roth, G. A., Ng, M., Biryukov, S., Marczak, L., Alexander, L., Estep, K., Hassen Abate, K., Akinyemiju, T. F., Ali, R., Alvis-Guzman, N., Azzopardi, P., Banerjee, A., Barnighausen, T., Basu, A., Bekele, T., Bennett, D. A., Biadgilign, S., ... Murray, C. J. (2017). Global burden of hypertension and systolic blood pressure of at least 110–115 mm Hg, 1990–2015. *JAMA*, 317(2), 165–182. <https://doi.org/10.1001/jama.2016.19043>.
- Gaziano, T. A., Bitton, A., Anand, S., & Weinstein, M. C.: International Society of, H. (2009). The global cost of nonoptimal blood pressure. *Journal of Hypertension*, 27(7), 1472–1477. <https://doi.org/10.1097/HJH.0b013e32832a9ba3>.
- GBD Risk Factors Collaborators. (2024). Global burden and strength of evidence for 88 risk factors in 204 countries and 811 subnational locations, 1990–2021: A systematic analysis for the global burden of disease study 2021. *The Lancet*, 403(10440), 2162–2203. [https://doi.org/10.1016/S0140-6736\(24\)00933-4](https://doi.org/10.1016/S0140-6736(24)00933-4)
- Geldsetzer, P., Manne-Goehler, J., Marcus, M. E., Ebert, C., Zhumadilov, Z., Wesseh, C. S., Tsabedze, L., Supiyev, A., Sturua, L., Bahendeka, S. K., Sibai, A. M., Quesnel-Crooks, S., Norov, B., Mwangi, K. J., Mwalim, O., Wong-McClure, R., Mayige, M. T., Martins, J. S., Lunet, N., ... Jaacks, L. M. (2019). The state of hypertension care in 44 low-income and middle-income countries: A cross-sectional study of nationally representative individual-level data from 1.1 million adults. *The Lancet*, 394(10199), 652–662. [https://doi.org/10.1016/s0140-6736\(19\)30955-9](https://doi.org/10.1016/s0140-6736(19)30955-9)
- Geldsetzer, P., Tan, M. M., Dewi, F. S., Quyen, B. T., Juvekar, S., Hanifi, S. M., Roy, S., Asgari-Jirhandeh, N., Reidpath, D., & Su, T. T. (2022). Hypertension care in demographic surveillance sites: A cross-sectional study in Bangladesh, India, Indonesia, Malaysia, VietNam. *Bulletin of the World Health Organization*, 100(10), 601–609. <https://doi.org/10.2471/blt.22.287807>
- Gliklich, R. E., Dreyer, N. A., & Leavy, M. B. (2014). *Registries for evaluating patient outcomes: A user's guide* [Internet] (3rd ed.). Agency for Healthcare Research and Quality. <https://www.ncbi.nlm.nih.gov/books/NBK208643/>.
- Gyaneshwar, R., Naidu, S., Raban, M. Z., Naidu, S., Linhart, C., Morrell, S., Tukana, I., & Taylor, R. (2016). Absolute cardiovascular risk in a Fiji medical zone. *BMC Public Health*, 16, 128. <https://doi.org/10.1186/s12889-016-2806-6>.
- Ibrahim, M. M., & Damasceno, A. (2012). Hypertension in developing countries. *The Lancet*, 380(9841), 611–619. [https://doi.org/10.1016/s0140-6736\(12\)60861-7](https://doi.org/10.1016/s0140-6736(12)60861-7).
- Jeemon, P., Severin, T., Amodeo, C., Balabanova, D., Campbell, N. R. C., Gaita, D., Kario, K., Khan, T., Melifonwu, R., Moran, A., Ogola, E., Ordunez, P., Perel, P., Pineiro, D., Pinto, F. J., Schutte, A. E., Wyss, F. S., Yan, L. L., Poulter, N. R., ... Prabhakaran, D. (2021). World heart federation roadmap for hypertension – A 2021 update. *Global Heart*, 16(1), 63. <https://doi.org/10.5334/gh.1066>.
- Kearney, P. M., Whelton, M., Reynolds, K., Muntner, P., Whelton, P. K., & He, J. (2005). Global burden of hypertension: Analysis of worldwide data. *The Lancet*, 365(9455), 217–223. [https://doi.org/10.1016/s0140-6736\(05\)17741-1](https://doi.org/10.1016/s0140-6736(05)17741-1).
- Latt, T., Zaw, K. K., Ko, K., Ohnmar, M., Hlaing, M. M., Oo, E. S., & Thein, K. M. M. (2014). *Report on national survey of diabetes mellitus and risk factors for noncommunicable diseases in Myanmar 2014*. Ministry of Health, World Health Organization, World Diabetes Foundation.

- Lee, M., Lee, H., Park, J., Kim, H. J., Kwon, R., Lee, S. W., Kim, S., Koyanagi, A., Smith, L., Kim, M. S., Fond, G., Boyer, L., Rahmati, M., Rhee, S. Y., & Yon, D. K. (2023). Trends in hypertension prevalence, awareness, treatment, and control in South Korea, 1998–2021: A nationally representative serial study. *Scientific Reports*, 13(1), 21724. <https://doi.org/10.1038/s41598-023-49055-8>.
- Li, F., Li, J., Tan, S., Zeng, G., Zhu, J., Zhou, J., Zhang, Z., Lin, Q., Liu, N., & Liu, Q. (2025). Cardiovascular disease attributable to high systolic blood pressure in younger adults requires greater attention: Insights from the global burden of disease study 2021. *Journal of the American Heart Association*, 14(12), e041964. <https://doi.org/10.1161/JAHA.125.041964>.
- Liss, D. T., Uchida, T., Wilkes, C. L., Radakrishnan, A., & Linder, J. A. (2021). General health checks in adult primary care: A review. *JAMA*, 325(22), 2294–2306. <https://doi.org/10.1001/jama.2021.6524>.
- Liu, L., Chen, C. L., Lo, K., Huang, J. Y., Yu, Y. L., Huang, Y. Q., & Feng, Y. Q. (2020). Trends of status of hypertension in Southern China, 2012–2019. *International Journal of General Medicine*, 13, 599–608. <https://doi.org/10.2147/ijgm.S267346>.
- Memon, F., Beaney, T., Clarke, J., Ishaq, M., & Bai, K. (2022). May measurement month 2019: An analysis of blood pressure screening results from Pakistan-South Asia. *European Heart Journal Supplements*, 23(Supplement_B), B117–B119. <https://doi.org/10.1093/eurheartj/suab044>.
- Mills, K. T., Bundy, J. D., Kelly, T. N., Reed, J. E., Kearney, P. M., Reynolds, K., Chen, J., & He, J. (2016). Global disparities of hypertension prevalence and control: A systematic analysis of population-based studies from 90 Countries. *Circulation*, 134(6), 441–450. <https://doi.org/10.1161/circulationaha.115.018912>.
- Mills, K. T., O’Connell, S. S., Pan, M., Obst, K. M., He, H., & He, J. (2024). Role of health care professionals in the success of blood pressure control interventions in patients with hypertension: A meta-analysis. *Circulation. Cardiovascular Quality and Outcomes*, 17(8), e010396. <https://doi.org/10.1161/CIRCOUTCOMES.123.010396>.
- Minh, H. V., Poulter, N. R., Viet, N. L., Sinh, C. T., Hung, P. N., Ngoc, N. T. M., Hung, N. V., Son, T. K., Dong, N. T., Thang, D. C., Thuan, N. D., Tuan, T. A., Beaney, T., Partington, G., & Tien, H. A. (2021). Blood pressure screening results from May measurement month 2019 in Vietnam. *European Heart Journal Supplements: Journal of the European Society of Cardiology*, 23(Suppl B), B154–b157. <https://doi.org/10.1093/eurheartj/suab035>.
- Ministry of Health. (2012). *The health of New Zealand adults 2011/12: Key findings of the New Zealand health survey*. Ministry of Health.
- Ministry of Health and Department of Census and Statistics. (2021). *Noncommunicable diseases risk factor survey (STEPS) Sri Lanka 2021*. Ministry of Health and Department of Census and Statistics.
- Ministry of Health and Population (Nepal), New ERA, ICF. (2023). *Nepal demographic and health survey 2022*. Ministry of Health and Population [Nepal].
- National Institutes of Health (NIH). (2019). *National health and morbidity survey 2019 NCDs–noncommunicable diseases: Risk factors and other health problems*. National Institutes of Health (NIH), Ministry of Health Malaysia.
- NCD Risk Factor Collaboration. (2021). Worldwide trends in hypertension prevalence and progress in treatment and control from 1990 to 2019: A pooled analysis of 1201 population-representative studies with 104 million participants. *The Lancet*, 398(10304), 957–980. [https://doi.org/10.1016/S0140-6736\(21\)01330-1](https://doi.org/10.1016/S0140-6736(21)01330-1).
- O’Brien, E. (2017a). How registries can guide our future? *Hypertension*, 69(2), 198–199. <https://doi.org/10.1161/hypertensionaha.116.08638>.
- O’Brien, E. (2017b). The Lancet commission on hypertension: Addressing the global burden of raised blood pressure on current and future generations. *The Journal of Clinical Hypertension (Greenwich)*, 19(6), 564–568. <https://doi.org/10.1111/jch.12998>.
- Orduñez-García, P., Munoz, J. L., Pedraza, D., Espinosa-Brito, A., Silva, L. C., & Cooper, R. S. (2006). Success in control of hypertension in a low-resource setting: The Cuban experience. *Journal of Hypertension*, 24(5), 845–849. <https://doi.org/10.1097/01.hjh.0000222753.67572.28>.
- Pengpid, S., & Peltzer, K. (2022). National trends in prevalence, awareness, treatment, and control of hypertension among adults in Mongolia from 4 cross-sectional surveys in 2005, 2009, 2013, and 2019. *Medicine*, 101(33), e30140. <https://doi.org/10.1097/md.00000000000030140>.
- Potts, H., Baatarsuren, U., Myanganbayar, M., Purevdorj, B., Lkhagvadorj, B. U., Ganbat, N., Dorjpalam, A., Boldbaatar, D., Tuvdendarjaa, K., Sampilnorov, D., Boldbaatar, K., Dashtseren, M., Batsukh, B., Tserengombo, N., Unurjargal, T., Palam, E., Bosurgi, R., So, G., Campbell, N. R. C., ... Dashdorj, N. (2020). Hypertension prevalence and control in Ulaanbaatar, Mongolia. *The Journal of Clinical Hypertension (Greenwich)*, 22(1), 103–110. <https://doi.org/10.1111/jch.13784>.
- R Core Team. (2024). *R: A language and environment for statistical computing*. R Foundation for Statistical Computing. <https://www.r-project.org/>.
- Sadeghi, F., Cheraghian, B., Mohammadi, Z., Sepanlou, S. G., Masoudi, S., Rahimi, Z., Daneshchin, L., Paridar, Y., Abolnezhadian, F., Noori, M., Mard, S. A., Shayesteh, A. A., & Poustchi, H. (2021). Impact of 2017 ACC/AHA guideline on prevalence, awareness, treatment, control, and determinants of hypertension: A population-based cross-sectional study in southwest of Iran. *Population Health Metrics*, 19(1), 26. <https://doi.org/10.1186/s12963-021-00260-5>.
- Sepanlou, S. G., Mehdipour, P., Ghanbari, A., Djalalinia, S., Peykari, N., Kasaeian, A., Rezaei, N., Larijani, B., Malekzadeh, R., & Farzadfar, F. (2021). Levels and trends of hypertension at national and subnational scale in Iran from 1990 to 2016: A systematic review and pooled analysis. *Archives of Iranian Medicine*, 24(4), 306–316. <https://doi.org/10.34172/aim.2021.43>.
- Singh, M. M., Basu, S., Lalwani, H., Rao, S., Maheshwari, V., Garg, S., & Sharma, N. (2023). Hypertension care cascade in an urban resettlement colony and slum in Delhi, India: A cross-sectional survey. *BMC Public Health*, 23(1), 2116. <https://doi.org/10.1186/s12889-023-17021-8>.

- Sison, J., Cawed-Mende, R. M., & Oliva, R. V. (2021). Prevalence, awareness, and treatment profile of adult Filipino hypertension individuals: Philippine Heart Association-Council on Hypertension report on survey of hypertension (PRESYON-4). *Philippine Journal of Cardiology*, 49(2), 53–68. <https://doi.org/10.69944/pjc.e0ed50316d>.
- United Nations, Economic and Social Commission for Asia and the Pacific (ESCAP). (2023). *Asia-Pacific population and development report 2023 (ST/ESCAP/3112)*. United Nations Publication.
- United States Census Bureau. (2025). *International database (IDB) Population estimates and projections for 227 countries and equivalent areas, plus 16,919 subnational areas*. Retrieved 11 January 2025. <https://www.census.gov/data-tools/demo/idb/>.
- World Health Organization. (2018). *National household health survey in Turkey prevalence of noncommunicable disease risk factors 2017*.
- World Health Organization. (2023a). *Global report on hypertension: The race against a silent killer*.
- World Health Organization. (2023b). *Hypertension Mongolia 2023 country profile*. <https://www.who.int/publications/m/item/hypertension-mng-2023-country-profile>.