

Review Article

Major non-communicable diseases in Asia: Burden, epidemiological trends and projections, and future challenges

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Abstract

The high burden and rising prevalence of non-communicable diseases (NCDs) continue to be major contributors to disability and mortality across Asia amid rapid epidemiological transition. The aim of this review was to summarize the current burden of NCDs, as well as their trends and future projections, across the major disease groups in Asia, including cardiovascular diseases, diabetes, cancer, chronic respiratory diseases, and chronic kidney disease. Available evidence indicates that the burden of NCDs varies substantially across the region. By 2050, crude mortality from NCDs in Asia is projected to double, driven largely by population growth and demographic ageing. Cardiovascular diseases remain the leading cause of NCD-related death, whereas diabetes and chronic kidney disease are the fastest-growing NCDs among younger populations. In addition, cancer and chronic respiratory diseases are expected to impose an increasingly substantial health and economic burden. Key drivers of the future NCD burden include population ageing, urbanization, lifestyle-related risk factors, environmental exposures, and inequities in access to health care. These trends highlight the urgent need for Asian health systems to respond through coordinated, evidence-based policy initiatives, with particular emphasis on strengthening primary health care, prevention, early detection, and sustainable financing to reduce the projected future burden of NCDs.

Keywords: Non-communicable diseases, cardiovascular diseases, diabetes mellitus, disease burden, Asia

Introduction

The rise of non-communicable diseases (NCDs) worldwide, particularly in Asia, where countries are undergoing rapid demographic and socio-economic transitions, has become an increasingly urgent global health challenge [1]. The number of individuals affected by, newly diagnosed with, dying from, and living with disability due to NCDs continues to increase [2]. The burden of NCDs is driven by a combination of structural and behavioral factors, including population ageing, urbanization, changing dietary patterns, tobacco use, environmental pollution, and limitations in health system capacity [3]. The interaction of these drivers has accelerated the epidemiological transition in Asia and shifted the disease burden from communicable diseases to NCDs [4]. Among these determinants, demographic change and population dynamics are central to both the current and future burden of NCDs, as they shape the number of individuals living with NCDs, the age distribution of affected populations, survival duration, and the complexity of care needs. Collectively, these factors may place increasing long-term pressure on national health systems and health financing [5].



Population ageing has been recognized as a major contributor to the growing NCD burden in Asia [6]. From both biological and epidemiological perspectives, older age is associated with greater susceptibility to cardiometabolic diseases, cancer, chronic respiratory diseases, and chronic kidney disease, partly because of cumulative exposure to risk factors across the life course [7]. Ageing is also associated with progressive declines in physiological function and a higher prevalence of multimorbidity, which often requires more integrated and long-term health care approaches [8]. Evidence shown that Asian countries experiencing rapid population ageing are also facing substantial increases in multimorbidity and demand for long-term care [9]. However, empirical evidence remains limited regarding the extent to which population ageing independently explains regional differences in NCD burden across Asia, as this relationship is also influenced by factors such as health system performance, preventive policies, and social inequalities [10]. This gap in evidence highlights the need for further analyses to better understand how demographic change may shape future projections of the NCD burden in Asia [11].

The aim of this review was to summary the recent trends, current burden, and future projections of the major types of NCDs in Asia, and to discuss how these patterns may be influenced by demographic change and other contextual factors. The findings of this review may provide an evidence base for developing more sustainable strategies to prevent and control NCDs across Asia.

Current burden of major non-communicable diseases in Asia

Recent evidence indicates that NCDs have become more prevalent than communicable diseases globally [12]. The Asia-Pacific region has also experienced a marked rise in the number of cases and deaths related to these diseases, with Southeast Asia bearing a substantial share of the burden [13]. According to 2021 data, approximately two thirds of all deaths in the World Health Organization (WHO) South-East Asia Region were attributable to NCDs (**Figure 1A**), and half of those who died from an NCD were between 30 and 69 years of age [14]. Among NCD-related deaths in the region, cardiovascular diseases accounted for the largest share, with approximately 3.9 million deaths; however, trends varied across other NCD categories [15]. South Asia experienced a 21% increase in diabetes incidence and a 13% increase in cancer incidence between 2010 and 2021, whereas the incidence of cardiovascular and respiratory diseases declined slightly, by 3% and 13%, respectively [6].

The disability-adjusted life year (DALY) rate attributable to NCDs in South Asia was 23,033.05 per 100,000 population, which remains above the global average [6]. In addition to the adult population, NCDs also affect younger age groups in the Asia-Pacific region, where mental disorders such as anxiety and depression have become leading causes of years lived with disability among children and adolescents [16]. Decomposition analyses show that population growth and ageing are major drivers of increasing NCD mortality in countries such as India, Bangladesh, and Nepal [6]. Behavioral factors that often begin in childhood, including unhealthy diets, physical inactivity, and tobacco use, further increase chronic disease risk in adulthood [17].

The NCD challenge in the region is further exacerbated by gaps in primary health care (PHC) systems that were originally designed to address communicable diseases and have not fully adapted to the demands of long-term chronic care [18]. Country capacity reports indicate that only around 60% of countries in Southeast Asia have treatment guidelines for the four major NCD groups, namely cardiovascular diseases, diabetes, cancer, and chronic respiratory diseases, and the availability of essential diagnostic technologies at the PHC level is only slightly above 50% [19]. Environmental risks such as air pollution are major contributors to DALYs from cardiovascular and respiratory diseases, while metabolic risks such as high systolic blood pressure and high fasting plasma glucose remain critical public health concerns [20]. Therefore, comprehensive multisectoral approaches, stronger health infrastructure, and evidence-based prevention strategies are required to reduce the NCD burden and improve population quality of life.

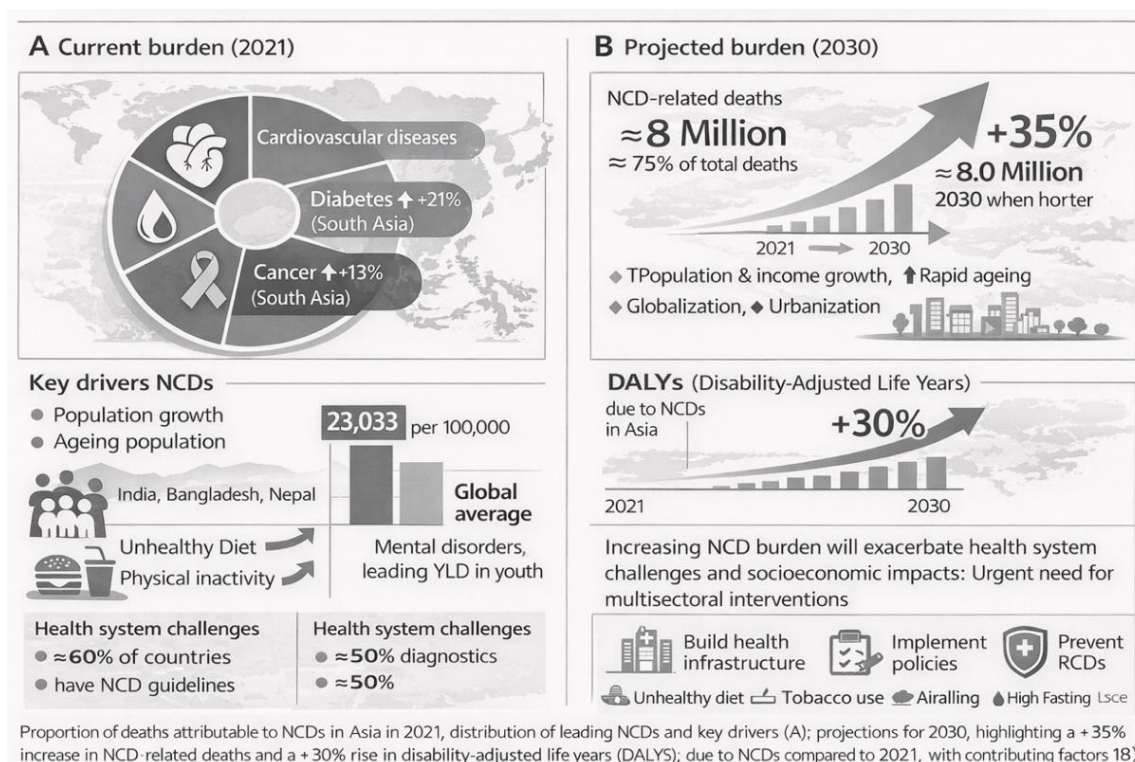


Figure 1. Current and projected burden of major non-communicable diseases (NCDs) in Asia. (A) Current burden of major NCDs in Asia in 2021, showing mortality dominance, distribution of leading NCDs, disability burden, and key demographic, behavioral, and health system drivers. (B) Projected burden of major NCDs in Asia by 2030, illustrating the anticipated increase in NCD-related mortality and disability-adjusted life years (DALYs) based on available Asia-specific estimates. This figure represents the authors' synthesis of previously published data [1,21-23].

A comparative perspective across Asian subregions reveals substantial heterogeneity in the burden of NCDs [24]. East Asia is characterized by rapidly ageing populations and a high prevalence of cardiovascular diseases and cancer, reflecting an advanced epidemiological transition [25-27]. In contrast, South Asia has experienced a marked increase in diabetes and other metabolic disorders, driven by rapid urbanization, dietary change, and limited preventive health system capacity [29,30]. Southeast Asia faces a dual burden in which NCDs coexist with infectious diseases, compounded by disparities in health care access and system capacity [6,14]. Meanwhile, countries in the Middle East show some of the highest rates of obesity and diabetes, largely associated with economic growth, sedentary lifestyles, and nutritional transition [30,31]. These variations indicate that NCD trends across Asia are not uniform and require region-specific policy approaches rather than a single generalized strategy.

Projected trends of major non-communicable diseases

The burden of NCDs, including cardiovascular disease, cancer, diabetes, and chronic respiratory disease, has increased substantially in Asia as a result of the epidemiological transition from infectious to chronic diseases [1]. Cardiovascular mortality in Asia is projected to approximately double by 2050 because of population growth and ageing (**Figure 1B**) [21]. Cardiovascular disease is also the leading cause of NCD-related death globally; however, global projections suggesting that up to 86.1% of NCD deaths by 2050 may be attributable to cardiovascular diseases should be interpreted separately from Asia-specific projections [1]. Ischemic heart disease is expected to remain the leading cause of cardiovascular mortality, with high systolic blood pressure as a major metabolic risk factor [32]. Hypertension prevalence in China increased from 18.8% in 2002 to 27.5% in 2018, and in Iran, it is projected to reach 42.5% in women and 35.2% in men by 2030 [33]. In India, cardiovascular diseases account for approximately 45% of all NCD-related deaths [34]. These findings underscore the importance of distinguishing global estimates

from Asia-specific projections, as the magnitude and drivers of NCD burden may differ substantially across regions.

In recent decades, the global diabetes epidemic has become a major contributor to the growing burden of cardiometabolic disorders in Asia [35]. Diabetes prevalence has increased markedly; in China, for example, it rose from 2.6% in 2002 to 11.9% in 2018 [36]. Globally, the incidence of diabetes has shown an average annual increase of 2.41% [29]. Projections suggest that by 2050, the number of people living with diabetes-related complications, such as myocardial infarction or stroke, will reach unprecedented levels, largely because of the obesity epidemic and metabolic dysregulation [37]. These complications are increasingly occurring earlier in life and are shifting toward younger populations, particularly in low- and middle-income countries [38]. In Iran, diabetes prevalence is projected to reach 11.2% in women and 9.5% in men by 2030, highlighting the long-term challenges faced by health systems in developing countries [39].

The number of cancer cases and cancer-related deaths in Southeast Asia is expected to rise substantially in line with global trends, with neoplasms projected to account for 24.4% of NCD deaths by 2050 [1]. In 2019, cancer accounted for 24.1% of total deaths in China and 12% of total NCD deaths in India [40]. The growing cancer burden is driven largely by population ageing, sedentary lifestyles, and tobacco use [41]. Capacity for early cancer diagnosis varies widely across countries; Japan has made considerable progress in developing such systems, whereas many other countries still lack the infrastructure needed for early detection [42]. In addition, sex-based differences in cancer mortality have been reported, with men generally showing higher overall cancer mortality than women, although incidence rates may be higher among women in some socio-demographic groups [43].

Chronic obstructive pulmonary disease (COPD) and other chronic respiratory diseases are expected to become increasingly important causes of death overtime [44]. Smoking and exposure to air pollution are the primary contributors to the rising burden of COPD, with air pollution alone being associated with approximately 1.67 million deaths annually in India [45]. Several Asian cities rank among the most polluted in the world, with direct consequences for life expectancy [46]. Air pollution also contributes substantially to the burden of DALYs, particularly in Southeast Asia and the Western Pacific region [47]. The economic costs associated with respiratory diseases are considerable and may hinder progress toward Sustainable Development Goals related to poverty reduction and economic growth [48].

Chronic kidney disease (CKD), largely driven by diabetes and hypertension, continues to increase in prevalence and mortality and poses a major challenge for health systems [49]. Estimates suggest that incident CKD cases will continue to rise through 2050, creating substantial demand for dialysis and kidney transplantation services [1]. This trend is likely to worsen because of low awareness, inadequate treatment, and poor control of key CKD risk factors, particularly in rural areas [50]. In China, only 11% of individuals with hypertension had their blood pressure adequately controlled as of 2018 [51]. Without strong public health measures, including higher tobacco taxes, salt reduction strategies, and promotion of healthy lifestyles, NCDs will continue to adversely affect both economies and quality of life across Asia.

Key drivers of future burden of non-communicable diseases

Population ageing is one of the major drivers of the future increase in NCD burden [1]. Continued growth of the older population is expected to amplify the burden of NCDs [22]. Globally, projections estimate that approximately 75.5 million people will die from NCDs by 2050, and a substantial proportion of this burden in Asia is expected to result from ongoing demographic and epidemiological transitions [1]. Other major drivers include nutritional transition and obesity, with body mass index-related risk having increased by 57.8% since 1990, as well as elevated plasma glucose and prolonged hyperglycemia, which contribute substantially to the global burden of diabetes and kidney disease [23, 52].

Tobacco use remains a major modifiable risk factor and accounts for 9.9% of global DALYs, contributing substantially to the burden of cancer and other NCDs [23]. Many harmful health behaviors that contribute to NCDs begin during adolescence, and alcohol and illicit drug use also

play important roles in future disease risk [53]. Among environmental determinants, air pollution has emerged as one of the most important because of its strong association with COPD and cardiovascular mortality in Southeast Asia [54]. Although other environmental pollutants are increasing in many countries, mortality attributable to air pollution continues to pose one of the greatest health threats in the developing world [55]. In addition, inequities in access to health services and other social determinants of health, including education and socio-economic status, intensify the NCD burden. Countries with low socio-demographic index have been shown to face substantial systemic barriers and chronically underfunded health systems in responding to NCDs [1].

Health system challenges in Asia

PHC systems in Asia face numerous challenges in responding to NCDs, including workforce shortages, inadequate infrastructure, limited availability of essential medicines, and insufficient financial support [56]. Despite strong political commitment in many settings, the capacity of health systems in low- and middle-income countries to manage chronic diseases remains limited because many of these systems were originally designed to address acute or communicable conditions through episodic rather than continuous care [49]. Task shifting to nurses and community health workers may help address service gaps, but is often constrained by excessive workloads, inadequate supervision, and rigid hierarchies that limit the effective performance of PHC staff [57]. In addition, substantial disparities in health care access persist between rural and urban communities [58]. Rural areas generally have less access to metabolic screening and routine follow-up than urban areas [59].

Coverage of screening for diabetes remains inadequate and, in some settings, has declined because of funding constraints and a persistent health system focus on hospital-based treatment rather than community-level prevention [60]. Weak logistics, the absence of standard operating procedures, and poor multisectoral coordination, particularly in resource-constrained settings, are major barriers to implementing primary and secondary prevention strategies [61]. Indonesia's chronic disease management program (Prolanis) has also faced challenges related to the inconsistent availability of laboratory test results, such as HbA1c, which undermines equitable service provision across the archipelago [62]. In addition, disruption of PHC resources during the COVID-19 pandemic further weakened service delivery and continuity of care [63].

The long-term financial burden associated with NCDs poses a major threat to the sustainability of national and universal health coverage systems as health care costs continue to rise [64]. Without expanded financial protection, underinvestment at the PHC level may persist, forcing patients to pay out of pocket for services, medicines, and transportation, thereby increasing the risk of household impoverishment [65]. Furthermore, reimbursement schemes for preventive services are often inadequate, and low health literacy may increase reliance on traditional medicine in place of evidence-based care [66]. Without stronger leadership, governance, and multisectoral coordination, implementation of NCD policies at the PHC level is likely to remain slow and fragmented.

Strategic opportunities and policy implications

Empowering community health volunteers and applying task-shifting strategies to strengthen PHC systems may improve local NCD management by increasing screening coverage and enhancing program effectiveness [67]. Integrating NCD services into both PHC and communicable disease clinics may also strengthen health system responsiveness to the overall disease burden by facilitating earlier detection and timely triage [68]. Cross-sectoral approaches are needed to address the commercial determinants of health and to align lifestyle intervention policies across ministries, thereby supporting sustainable behavior change within communities [69]. Inclusive strategic communication may further improve program visibility and stakeholder engagement while countering health misinformation [70]. Regional cooperation could strengthen these opportunities through exchange of expertise, technical training, and sharing of best practices, thereby facilitating adoption of international standards and development of more comprehensive frameworks to address the multifaceted challenges posed by NCDs [70].

Future challenges

The rising burden of NCDs and multimorbidity represents a major challenge to health systems worldwide, particularly in low- and middle-income countries, where resources and infrastructure remain limited [71]. By 2050, NCDs are projected to cause approximately 75.5 million deaths globally, with cardiovascular diseases accounting for the majority of these deaths [1]. This increasing burden is linked to unhealthy dietary patterns, physical inactivity, urbanization, and greater exposure to air pollution [72]. Despite this growing need, the readiness of health systems to provide care for ageing populations remains limited, as reflected by inadequate preventive budgets and the lack of comprehensive services at the PHC level [71].

Significant barriers to NCD management persist, including poor financial management, shortages of diagnostic facilities and physical space, and high workloads and burnout among health workers [73]. In addition, major gaps remain in the research capacity needed to inform policy development. For example, in Pakistan, shortages of skilled researchers limit the ability of government institutions to prioritize NCD prevention programs [73]. Evidence-based policy adaptation, including the use of public-private partnerships, is therefore needed to improve access to financing and service quality, alongside structured research training programs to strengthen the capacity of health professionals to develop more effective and sustainable NCD management strategies.

Conclusion

Asia is projected to face a doubling of crude mortality from NCDs by 2050, driven primarily by cardiovascular diseases, diabetes, cancer, chronic respiratory diseases, and chronic kidney disease, together with population ageing and lifestyle-related changes. These findings highlight the urgency of coordinated policy responses that prioritize strengthening PHC, population-based prevention, and integration of NCD services. Without accelerated, comprehensive, and evidence-based interventions, the rising NCD burden may not only persist but also place even greater pressure on health systems and socio-economic development across Asia.

Ethics approval

Not required.

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Competing interests

The authors declare that there are no conflicts of interest.

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Underlying data

Derived data supporting the findings of this study are available from the corresponding author on reasonable request.

Declaration of artificial intelligence use

Artificial intelligence tool, ChatGPT, was used for language refinement, including improvement of grammar, sentence structure, and readability. All AI-assisted outputs were critically reviewed by the authors to ensure the integrity and reliability of the manuscript. All final decisions and interpretations presented in this article were made solely by the authors.

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