Review Article

The Rising Burden of Non-Communicable Diseases: Global and Indian Trends, Risk Factors, and Socioeconomic Implications

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How to cite this article: Mohd Yasir Zubair, Danish Kamal, Ragul Jayaprakasam Sathiyamoorthy et. al. The Rising Burden of Non-Communicable Diseases: Global and Indian Trends, Risk Factors, and Socioeconomic Implications. Indian Journal of Public Health Research and Development / Vol. 17 No. 2, April-June 2026.

Abstract

Non-communicable diseases (NCDs) have emerged as a significant global health challenge, particularly in low and middle-income countries. This review examines the rising burden of NCDs, focusing on global and Indian trends, risk factors, and socioeconomic implications. NCDs, including cardiovascular diseases, cancers, chronic respiratory diseases, and diabetes, accounted for 74% of global deaths in 2019, up from 56.75% in 1990. In India, NCD-related deaths increased from 35.87% to 64.93% during the same period. Key risk factors include tobacco use, physical inactivity, unhealthy diet, and alcohol consumption, alongside metabolic factors such as hypertension and obesity. The economic impact is substantial, with NCDs projected to cost the global economy over US$30 trillion between 2011-2030. The burden of NCDs, measured in disability-adjusted life years (DALYs), has also risen significantly. This review underscores the urgent need for comprehensive prevention and control strategies, emphasizing the importance of multi-sectoral approaches and primary healthcare interventions to address this growing epidemic.

Keywords: Non-communicable diseases, Global health burden, Risk factors, Socioeconomic impact, Prevention strategies

Introduction

Noncommunicable diseases (NCDs) are chronic or long term diseases comprising a large group of illnesses that includes diabetes, hypertension, chronic respiratory illnesses (asthma, COPD), cancers, and cardiovascular diseases such as stroke. These health conditions are characterized by their gradual onset and extended course. With increasing prevalence over the past few decades, these diseases have become a significant global health concern, contributing to a considerable burden of morbidity, mortality, and costs of healthcare.[1]

NCDs cause considerable loss in potentially productive years of life. Losses due to premature

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Submission date: October 8, 2025 **Revision date:** November 21, 2025 **Published date: April 14, 2026**

deaths attributable to heart diseases, stroke and diabetes are also projected to increase over the years. Non-communicable diseases (NCDs), including heart disease, stroke, diabetes and chronic lung disease, cancer,, are collectively responsible for 41 million deaths each year, which is equivalent to 74% of all deaths globally**.** More than three-quarters of NCD deaths, and 86% of the around 17 million people who died prematurely, or before reaching the age 70 years, occur in low- and middle-income countries.[2]Cardiovascular diseases account for most of the NCD deaths (17.9 million people annually), followed by cancers (9.3 million), chronic respiratory diseases (4.1 million), and diabetes (2.0 million including kidney disease deaths due to diabetes). These four groups of diseases are responsible for over 80% of all premature NCD deaths.[3] In India, Noncommunicable diseases (NCDs) contribute to around 5.87 million deaths that account for 60 % of all deaths in India. India shares more than two-third of the total deaths due to NCDs in the South-East Asia Region (SEAR) of WHO, of which cardiovascular diseases (coronary heart disease, stroke, and hypertension) contribute to 45% of all NCD deaths in India followed by chronic respiratory disease (22 %), cancers (12 %) and diabetes (3%). The global burden of NCDs is expected to rise further with increases in the global population (especially the older population) and demographic shifts.[4]

Need and Purpose of this review

Despite the well-documented rise in non-communicable diseases globally, there remains a critical need for comprehensive reviews that synthesize trends across multiple dimensions—mortality patterns, risk factor trajectories, economic implications, and disability burden, particularly with comparative analysis between global patterns and country-specific contexts. While individual studies have examined isolated aspects of NCDs, a holistic understanding of how these diseases are reshaping health landscapes in both developed and developing nations is essential for informed policy-making and resource allocation.

India, as the world's most populous nation undergoing rapid demographic and epidemiological transition, presents a unique case study for understanding NCD dynamics in low- and middle-income countries.Understanding the divergent trajectories of behavioral versus metabolic risk factors in the Indian context can provide valuable insights for other nations experiencing similar transitions.

The purpose of this review is threefold. First, it aims to provide a comprehensive overview of global and Indian NCD trends from 1990 to 2019, using data from the Global Burden of Disease Study to establish the magnitude of the problem. Second, it examines the evolution of major risk factors—both behavioral and metabolic—to identify areas where interventions have succeeded and where challenges persist. Third, it analyzes the socioeconomic implications of NCDs, including their impact on healthcare systems, household finances, productivity, and sustainable development goals, to underscore the urgency of comprehensive prevention and control strategies.

By synthesizing data from multiple national surveys, global burden of disease estimates, and economic analyses, this review seeks to inform evidence-based policy development and guide resource allocation for NCD prevention and control. Understanding these trends is crucial for achieving the Sustainable Development Goal target of reducing premature NCD mortality by one-third by 2030, particularly in resource-constrained settings where the burden is growing most rapidly.

Global Trends

Globally, NCDs accounted for 56.75% of all deaths in the year 1990 which increased to 74.37% in the year 2019. In men, NCDs accounted for 55.64% of all deaths in the year 1990 which increased to 73.01% in the year 2019. In women, NCDs accounted for 58.04% of all deaths in the year 1990 which increased to 75.98% in the year 2019.[5]

Trends in LMICs

The prevalence of non-communicable diseases (NCDs) in the low and middle-income countries (LMICs) such as India has been growing constantly over the past few decades, posing a major threat to people, their families, and communities while also hindering the potential achievement of sustainable development goals. Furthermore, high rates of NCDs in low and middle income countries pushes more people into poverty, inhibit economic development,

and weakens fragile health system making these countries less resilient in the face of emergencies such infectious disease outbreaks or natural disasters.[6] According to the Global Burden of Disease (GBD) Study, NCDs accounted for 56.8% of total deaths in LMICs in 1990, and it increased to 74.4% in 2019. The disability-adjusted life years (DALYs) attributed to NCDs in LMICs increased from 37.8% to 66.0% during the same period.[5]

India

In India, NCDs accounted for 35.87% (2.9 million deaths) of all deaths in the year 1990 which increased to 64.93% (6.1 million deaths) in the year 2019. In men, NCDs accounted for 39.33% of all deaths in the year 1990 which increased to 66.04% in the year 2019. In women, NCDs accounted for 31.95% of all deaths in the year 1990 which increased to 63.60% in the year 2019.[5]

NCD RISK FACTORS

Most NCDs are the result of four particular behaviours- tobacco use, physical inactivity, unhealthy diet, and the harmful use of alcohol. These behaviours lead to four key metabolic/physiological changes- raised blood pressure, overweight/obesity, raised blood glucose and raised cholesterol. The risk factors are described under the following headings:

Modifiable behavioural risk factors

Modifiable behaviours, such as tobacco use, lack physical activity, unhealthy diet and the harmful use of alcohol, all increase the risk of NCDs.[7]

- Tobacco leads to over 8 million deaths every year (including exposure to second-hand smoke).
- 1.8 million annual deaths may be attributed to excess salt or sodium intake.
- Of the 3 million annual deaths attributable to alcohol use, mire than half are from NCDs, including cancer.
- 8,30,000 deaths each year is attributable to insufficient physical activity.

NCD Risk Factors: Global Trend

Figure 1 shows trend of contribution of modifiable risk factors towards NCD deaths globally.

1. **Use of tobacco**

In the year 1990 use tobacco contributed to 22.34% of NCD deaths. This has shown slightly decreasing trend over the years and in the year 2019 tobacco use accounted for 19.19% of NCD deaths.[5]

2. **Physical Inactivity**

In this modern era, physical activity is acknowledged as a vital strategy to promote good health. According to the WHO, regular physical activity has various benefits for psycho-physical health. he risk of many chronic diseases such as cancer, cardiovascular condition, and diabetes (type 2) reduce through regular physical activity.[8] The contribution of insufficient physical activity towards NCD deaths has remained relatively constant over the years (Figure 3). It accounted for 1.71% NCD deaths in the year 1990, which increased marginally to 1.89% in the year 2010 and to 1.98% in the year 2019.[5]

3. **Harmful use of Alcohol**

The role of alcohol (and in particularly heavy alcohol use and having an alcohol abuse disorder) in NCDs is being given increasing recognition. Alcohol was mentioned along with use of tobacco, diet and lack of exercise, as one of four major common risk factors for NCD in the recent status report of the World Health Organization as well as by the Lancet NCD action group.[9,10] It has also been discussed at the recent NGO conference in Melbourne on health and the Millenium Development Goals (MDGs) during a session on NCDs where along with tobacco, diet and lack of exercise, alcohol was recognised as one of four major common risk factors.[3] In terms of NCDs, alcohol has been particularly linked to cancer, cardiovascular diseases and liver disease. Preliminary estimates on the impact of alcohol on these diseases support the inclusion of alcohol consumption as one of four major risk factors globally.[11]

Figure 2 shows that the contribution of Alcohol to global NCD deaths has stayed at a little over 4% for the last three decades.

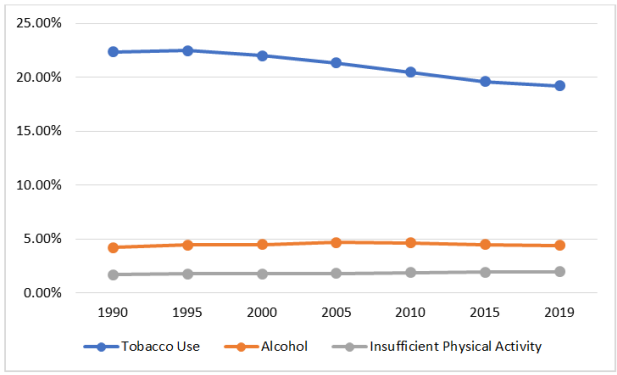

Figure 1: Contribution of Major Behavioural Risk Factors towards NCD Deaths (%) globally[5]

Metabolic risk factors

Metabolic risk factors contribute to four key metabolic changes that increase the risk of NCDs:

- raised blood pressure;
- overweight/obesity;
- hyperglycemia (high blood glucose levels); and
- hyperlipidemia (high levels of fat in the blood).

In terms of attributable deaths, globally the leading metabolic risk factor is raised blood pressure to which 19% of global deaths are attributed followed by uncontrolled blood glucose and overweight and obesity.[7] Figure 2 shows trends of contribution of these risk factors towards NCD deaths in the past 3 decades from the global burden of disease study (2019). In the year 2019 Hypertension is the major contributor towards NCD deaths globally followed by diabetes and dislipidemia.[5]

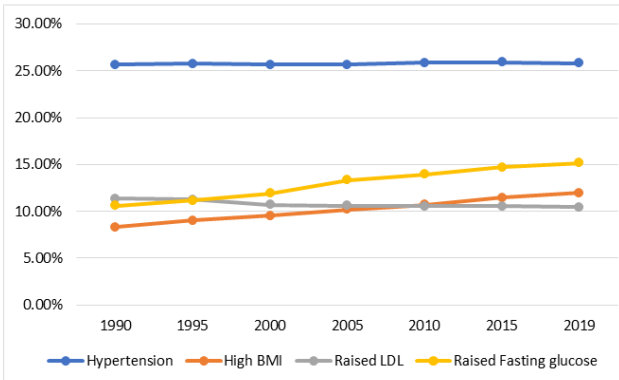

Figure 2: Contribution of Metabolic Risk Factors towards NCD Deaths (%) globally

Trends Of NCD Risk Factors In India

Behavioural risk factors

Amongst males in India, the prevalence of any form of tobacco use was 28.30% during 1998-99 as per National Family Health Survey 2 (NFHS 2) report.[12] It increased to 57% during 2005-06 (NFHS 3 report)[13] and has been on decline since then as reported in subsequent NFHS reports (Figure 3).[14,15] Similar trend is observed for alcohol consumption amongst males (Figure 5).

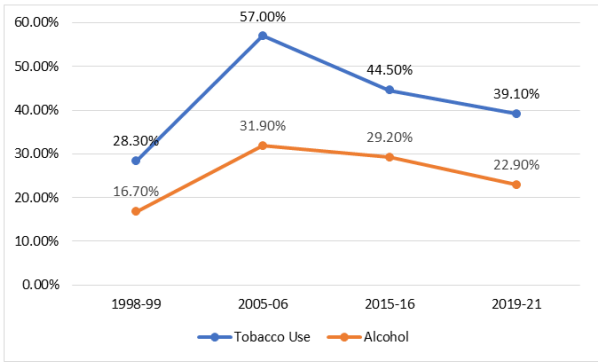

Figure 3: Trend of Behavioural NCD risk factors amongst Males in India[12-15]

In females, however, not only is the prevalence of these two risk factors much lower, it is also showing a continuous decline over last two decades (Figure 4).

With regards to physical activity, more than half of the urban Indians undertake insufficient physical activities, making them vulnerable to diabetes, hypertension and other non-communicable diseases, according to one of India's largest studies in this area.[16]

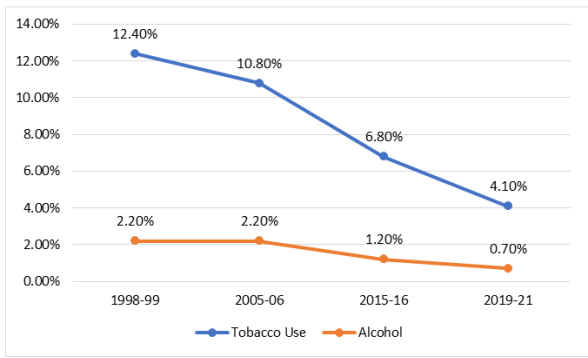

Figure 4: Trend of Behavioural NCD risk factors amongst Females in India[12-15]

Metabolic risk factors

Hypertension

Between 2015-16 to 2019-21, the prevalence of Hypertension amongst men in India increased from 14.8% to 24% whilst in women it rose from 11% to 21% (NFHS 4 and NFHS 5).[14,15]

Raised Blood Glucose

The prevalence of raised random blood glucose amongst men and women in India was found to be 8% and 5.8% in the year 2015-16 (NFHS 4).[14] It increased to 14.4% in men and 12.4% in women in the year 2019-21(NFHS 5).[15]

Body Mass Index

The prevalence of overweight men (BMI 25.0-29.9) was 18.9% in the year 2015-16 which rose to 18.9% in the year 2019-21. The prevalence of obesity (BMI ≥30.0) amongst men increased from 3.0% in 2015-16 to 4.0% in 2019-21. The prevalence of overweight women (BMI 25.0-29.9) was 15.5% in the year 2015-16 which rose to 17.6% in the year 2019-21. The prevalence of obesity (BMI ≥30.0) amongst women increased from 5.1% in 2015-16 to 6.4% in 2019-21.[12-15]

Environmental risk factors

Several environmental risk factors contribute to NCDs. Air pollution is the largest of these, accounting for 6.7 million deaths globally, of which about 5.7 million are due to NCDs, including stroke, ischaemic heart disease, chronic obstructive pulmonary disease, and lung cancer.

SOCIO-ECONOMIC IMPACT

NCDs threaten progress towards the 2030 Agenda for Sustainable Development, which includes a target of reducing the probability of death from any of the four main NCDs between ages 30 and 70 years by one third by 2030.

Poverty is closely linked with NCDs. The rapid rise in NCDs is predicted to impede poverty reduction initiatives in low-income countries, particularly by increasing household costs associated with health care. Vulnerable and socially disadvantaged people get sicker and die sooner than people of higher social positions, especially because they are at greater risk of being exposed to harmful products, such as tobacco, or unhealthy dietary practices, and have limited access to health services.

In low-resource settings, health-care costs for NCDs quickly drain household resources. The exorbitant costs of NCDs, including treatment, which is often lengthy and expensive, combined with loss of income, force millions of people into poverty annually and stifle development.

The socio-economic costs associated with NCDs make the prevention and control of these diseases a major development imperative for the 21st century. In the year 2011, the global economic burden of NCD study also reported that NCDs are likely to cause around US$47 trillion in output loss within the next two decades.[17] NCDs plausibly reduce the supply of efficient labour and productivity. As the mental and physical capacity of the worker deteriorates due to NCD morbidity, the level of productivity, efficient use of technology and machinery diminishes.[18]

Over the period 2011-2030, NCDs will cost the global economy more than US$ 30 trillion, representing 48% of global GDP in 2010, and pushing millions of people below the poverty line. Mental health conditions alone will account for the loss of an additional US$ 16.1 trillion over this time span, with dramatic impact on productivity and quality of life (World Economic Forum and Harvard, 2011).[19]

The Disability-Adjusted Life-Year (DALY)

The Disability-Adjusted Life-Year (DALY) is a metric that combines the burden of mortality and morbidity (non-fatal health problems) into a single number. It captures years of years life lost due to prematurity and years of life lived with disability. The DALY metric is used to provide a *single* number to capture *all* of the health costs caused by a disease.

GLOBAL

The increase in disability-adjusted life years (DALYs) attributed to NCDs was from 43.16% in the year 1990 to 63.82% in the year 2019. During the same period the disability-adjusted life years (DALYs) attributed to NCDs in men increased from 41.73% to 61.54% while in women it increased from 44.76% to 66.39%.[5]

INDIA

The disability-adjusted life years (DALYs) attributed to NCDs increased from 29.17% in 1990 to 57.92% in 2019. During the same period (from 1990 to 2019) the disability-adjusted life years (DALYs) attributed to NCDs in men increased from 30.34% to 57.32% while in women it increased from 27.96% to 58.52%.[5]

PREVENTION AND CONTROL

An important way to control NCDs is to focus on reducing the risk factors associated with these diseases. Low-cost solutions exist for governments and other stakeholders to reduce the common modifiable risk factors. Monitoring progress and trends of NCDs and their risk is important for guiding policy and priorities.

To lessen the impact of NCDs on individuals and society, a comprehensive approach is needed requiring all sectors, including health, finance, transport, education, agriculture, planning and others, to collaborate to reduce the risks associated with NCDs, and to promote interventions to prevent and control them.

Investing in better management of NCDs is critical. Management of NCDs includes detecting, screening and treating these diseases, and providing access to palliative care for people in need. High impact essential NCD interventions can be delivered through a primary health care approach to strengthen early detection and timely treatment. Evidence shows such interventions are excellent economic investments because, if provided early to patients, they can reduce the need for more expensive treatment. Countries with inadequate health care coverage are unlikely to provide universal access to essential NCD interventions. NCD management interventions are essential for achieving the SDG (Sustainable Development Goals) target on NCDs.

The 2030 Agenda for Sustainable Development recognizes NCDs as a major challenge for sustainable development. Specifically, target 3.4 of the Sustainable Development Goals calls for a one-third reduction in premature mortality from noncommunicable diseases by 2030 through the prevention and treatment of these diseases and the promotion of mental health and well-being. The economic burden of NCDs threatens the achievement of other SDGs, particularly reducing poverty, inequalities, and hunger, as well as access to quality education and gender equality.[19]

Discussion

The increasing burden of non-communicable diseases (NCDs) represents one of the most significant global health challenges of the 21st century. The data presented in this review illustrates a concerning shift in disease patterns, with NCDs now accounting for nearly three-quarters of global mortality. This epidemiological transition is particularly pronounced in low- and middle-income countries (LMICs), including India, where the proportion of deaths attributed to NCDs has increased dramatically from 35.87% in 1990 to 64.93% in 2019.

The increasing prevalence of NCDs in India presents a complex public health challenge characterized by contrasting trends in risk factors. While behavioral risk factors such as tobacco use and alcohol consumption among males have shown a declining trend since 2005-06, metabolic risk factors including hypertension, raised blood glucose, and obesity have increased substantially. This divergence suggests that while public health initiatives targeting tobacco and alcohol may have achieved some success, interventions addressing diet, physical activity, and metabolic risk factors require significant strengthening.

The rapid urbanization and socioeconomic development in India may partially explain these trends. Urban environments often promote sedentary lifestyles, increased consumption of processed foods high in salt, sugar, and unhealthy fats, and reduced physical activity. The finding that more than half of urban Indians undertake insufficient physical activity underscores this challenge. Furthermore, the transition away from traditional dietary patterns toward westernized diets has likely contributed to the rising prevalence of obesity and related metabolic disorders.

The gender differences observed in both behavioral and metabolic risk factors merit special attention. While women show lower prevalence of tobacco use and alcohol consumption, the

increasing rates of obesity among women (5.1% in 2015-16 to 6.4% in 2019-21) highlight the need for gender-sensitive approaches to NCD prevention and control. Socio-cultural factors influencing physical activity, dietary choices, and healthcare access for women must be considered in policy development.

The economic implications of NCDs extend beyond healthcare costs to include reduced productivity, increased household expenditure, and lost economic opportunities. The projection that NCDs will cost the global economy more than US$ 30 trillion over the period 2011-2030 highlights the macroeconomic significance of these diseases. For India, with its large working-age population and aspirations for continued economic growth, addressing NCDs is not merely a health imperative but an economic necessity.

The substantial increase in disability-adjusted life years (DALYs) attributed to NCDs in India, from 29.17% in 1990 to 57.92% in 2019, reflects the growing impact of these conditions on quality of life and productivity. This trend is particularly concerning for a country with a relatively young population, as premature morbidity and mortality from NCDs can significantly undermine demographic dividend opportunities.

Prevention and control strategies for NCDs must be multifaceted and integrated into existing health systems. The primary healthcare approach suggested in this article offers a cost-effective strategy for early detection and management of NCDs. However, successful implementation requires addressing systemic challenges including healthcare financing, workforce capacity, access to essential medicines, and robust surveillance systems.

The interrelationship between NCDs and sustainable development deserves greater emphasis. The bidirectional relationship between poverty and NCDs creates a vicious cycle that can trap individuals and communities in economic hardship. Conversely, addressing NCDs can contribute to poverty reduction, economic growth, and social development, supporting multiple Sustainable Development Goals beyond health-specific targets.

Conclusion

The rising burden of non-communicable diseases represents a critical challenge for global public health, particularly for low- and middle-income countries like India. The substantial increase in NCD-related mortality and morbidity, coupled with divergent trends in risk factors, necessitates urgent action across multiple sectors. While behavioral risk factors show promising declines, the alarming rise in metabolic risk factors demands targeted interventions addressing urbanization, dietary transitions, and physical inactivity patterns.

Addressing NCDs requires integration of prevention and control measures into primary healthcare systems, supported by sustainable financing and trained healthcare workers. The economic burden of these diseases underscores that investments in NCD prevention are not merely expenditures but essential contributions to human capital development and economic resilience. Only through coordinated, multi-sectoral approaches can countries achieve the Sustainable Development Goal of reducing premature NCD mortality while simultaneously promoting economic prosperity and social well-being.

The findings of this review carry critical implications for public health professionals at all levels. The divergent trends between declining behavioral risk factors and rising metabolic risk factors indicate that while tobacco and alcohol control policies have achieved partial success, urgent strengthening of interventions addressing obesogenic environments, physical inactivity, and unhealthy diets is essential. Public health professionals must advocate for multi-sectoral NCD policies that extend beyond healthcare to include urban planning, education, and agriculture sectors. Priority actions include strengthening primary healthcare systems for early detection and management through systematic screening programs, health workforce training, and ensuring access to essential medicines. The multifaceted nature of NCDs demands that public health professionals function as conveners, advocates, implementers, and evaluators, translating the evidence from this review into comprehensive strategies that reduce the NCD burden while contributing to broader sustainable development goals through immediate, sustained, and coordinated action across all health system levels.

Source(s) of support (Funding): Nil

Conflicting Interest: None.

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