Extended Abstract

Rising Burden of Non Communicable Diseases in South Asia: A Decomposition Analysis Based on GBD 2021 Data

Introduction

The world has witnessed a major epidemiological transition in the recent decades with a significant shift from communicable diseases to non-communicable diseases (NCDs) as the primary cause of mortality, particularly in low- and middle-income countries (Omotayo et al., 2024). According to the World Health Organization (WHO), by 2019, the NCDs were responsible for 73.9% deaths globally, which has risen from 59.5% deaths in 2000 (WHO, 2024). Every year, around 15 million people aged 30-69 years die prematurely due to NCDs. Research estimates indicate that the global age standardised death rate (ASDDR) for NCDs is 510.54 per 100,000 people, and the share of NCDs in total deaths is 75.26% globally (Khatoon et al., 2023).

According to the Pan American Health Organization (2024), four major groups of NCDs-cardiovascular diseases (17.9 million), cancer (9 million), respiratory diseases (3.9 million), and diabetes (1.6 million), are the leading causes of mortality from NCDs. Additionally; nearly 80% of NCD related deaths are premature worldwide. The global NCD Action Plan includes a robust worldwide monitoring system and sets nine global targets to be achieved by 2025 (WHO, 2013). These efforts align with the 2030 Agenda for Sustainable Development Goals (SDGs), which was adopted at the UN Summit on Sustainable Development in 2015 (United Nations, 2022).

South Asian countries, the world's densely populated region and home to one-fourth of the world's population, are a high-priority region for many public health concerns. These countries are facing a growing health burden associated with NCDs primarily due to rising globalisation, urbanisation, sedentary lifestyle, and changes in diet (Baye & Hirvonen, 2020). Additionally, differences in population across age groups, especially among older adults overweigh the disproportionately high risks of NCDs mortality experienced, particularly in South Asian regions (WHO, 2010; Metrics, 2019).

Therefore, the current study aims to assess the incidence, prevalence, death, and DALYs attributable by NCDs as a whole, along with four major NCDs like cardiovascular diseases, respiratory diseases, cancer, and diabetes in South Asian region as well as individual countries like India, Bhutan, Nepal, Bangladesh, and Pakistan. Additionally, the study assesses the contribution of demographic risk factors like ageing population, population growth, and mortality rates to the changing death rates and DALYs due to NCDs. It further evaluates the contribution of risk factors namely environmental factors, metabolic factors, and behavioural factors as the cause of NCDs. In addition, the study dissects the clusters of risk factors and examines the incidence cases, prevalence rate, death, and DALYs caused due to individual risk factors, otherwise termed as level 2 factors.

Data and Methods

We have obtained GBD 2021 data for South Asia from the Global Health Data Exchange GBD Results Tool, which are publicly available online resources. Additional insights were gathered from related data visualizations. Specifically, we have accessed summary results for incidence, death, prevalence, and DALYs for all NCDs using GBD Results Tool. In the present study, we have analysed data on NCDs and their associated level 1 and level 2 risk factors for 5 South Asian countries: India, Pakistan, Bhutan, Nepal, and Bangladesh based on

data availability. We estimated age-standardised incidence, death, prevalence, and DALYs for all NCDs with a particular focus on four major NCDs- CVDs, cancer, diabetes, and chronic respiratory diseases and examined their percentage change from 2010-2021 with 95% uncertainty intervals (UI). Additionally, the study provides estimates for all NCDs as per the gender (Male and Female) and age-groups(<5, 5-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80-84, 85-89, 90-94, 95+).

Based on the methodology given by Roth et al. (2015), the present study has employed decomposition analysis to understand the contribution of major risk factors like population growth, ageing, and change in age specific rate (mortality and DALYs) to change in NCD mortality and disability from 2010 to 2021. The age-specific rate takes into account all the changes that are not explained by demographic change (the population growth and ageing), rather it may include the combined effects of lifestyle risk factors and health care. The formula used in our analysis has been written as follows:

$$Death\ or\ DALYs_{i,y} = \sum_{i=1}^{17} \left(P_{iy} * A_{iy} * S_{iy}\right)$$

The expression $Death\ or\ DALYs_{i,y}$ denotes the death/DALYs due to NCDs. The term i and y denotes age groups (<5 years, 5-9, 10-14, 15-19, 20-24, 25-29, 30-34, 35-39, 40-44, 45-49, 50-54, 55-59, 60-64, 65-69, 70-74, 75-79, 80 and above) and time period from 2010 to 2021. The term P_{iy}, A_{iy}, and S_{iy} represents population growth, ageing, and age specific death/ DALYs rate by each age group within the specified time period. The analysis has been done by holding one factor constant at a time and calculating the expected deaths or years of disability under that counterfactual scenario.

Expected Results

The incidences of NCDs have increased by 3% in the SAR countries in the last decade. The ASDIR for diabetes Cancer have increased by 21% and 13% respectively in South Asian countries between 2010 and 2021. Furthermore, SAR countries have an ASDDR of 612.08 with a 3% reduction from 2010 to 2021. Pakistan, among all SAR countries, has reported the highest ASDDR (732.16) while Bhutan has the lowest ASDDR at 555.46. In SAR countries, the age-standardised DALY is 23033.05; which represents a 4% reduction over the last decade but remains higher than the global rate. Within the South Asian countries, Pakistan has reported the highest age-standardised DALY rate at 26330.3, while Bhutan has the lowest at 20594.36. The DALY cases due to diabetes have increased by 18% in the South Asian countries over the past decade. The age standardised DALY for cancer in SAR countries stands at 2123.92, making a 3% increase over the past decade.

Furthermore, behavioural factors contributed to 23.67% of NCDs in South Asian countries. Among the SAR countries, India has the highest contribution to the behavioural factors to DALY cases from NCDs at 23.95%. Tobacco consumption is the prime behavioural risk factor that contributes 26.69% in South Asian countries as the cause of respiratory diseases.

It shows that in South Asian region, the overall change in death rate from the period 2010-2021 due to NCDs is 34.1%. Results from the decomposition analysis suggest that the change in death rate due to NCDs in South Asia could have led to a 6.9% reduction, if the impact of population growth and ageing that contribute 16.3% and 24.7% respectively to total change in death rate is excluded. Similarly, the overall change in DALY rate from the period 2010-2021 due to NCDs is 25%. The decline in DALY by disability rate change could reduce to

5.6%, if the impact of population growth and ageing that contribute 16.3% and 14.3% respectively to total change in DALY caused by NCDs is excluded.

Conclusions

This study underscores the increasing burden within South Asia from 2010 to 2021. Despite a marginal decline in NCD-related mortality and DALYs, the rising incidence rates, especially in India and Pakistan, highlight a persistent public health crisis associated with the rising burden of the NCDs. The escalating burden necessitates urgent action to safeguard individual well-being and promote optimal health outcomes. Our analysis revealed towards the notable regional disparities and demographic variations, particularly concerning age and gender. It emphasises on the complexity of managing the burden of NCDs across the diverse populations in SAR regions and globally. The clustering of risk factors associated with NCDs suggests that identifying these clusters and their contributions is crucial for addressing the challenges within South Asia and its individual nations. By evaluating the primary risk factors influencing DALY cases, policymakers can enhance overall quality of life which can contribute in the reduction of the global health burden. These findings indicate a pressing need for targeted health interventions and policies tailored to the specific needs of diverse communities. Efforts should be made to minimize the risk factors contributing to the rising incidence of NCDs by addressing high-incidence areas and vulnerable populations. Promoting healthy lifestyle practices, including dietary modifications and increased physical activity, while reducing engagement in risk behaviours such as smoking, is essential. Furthermore, strengthening healthcare systems to ensure affordability, access, timely detection, and continuous surveillance is crucial in order to reduce the growing incidence . A multi-sectoral approach, fostering collaboration among various stakeholders, will be critical aspect in effective mitigation of the NCD epidemic and promoting health equity across the region.

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