

Double Burden of Disease in the Developing World: An Epidemiologic Perspective

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ABSTRACT

Developing countries continue to struggle with the morbidity and mortality of infectious diseases in combination with an increasing prevalence of non-communicable diseases in their population. This article examines the concept of the double burden of disease in the developing world. The effects of infectious diseases on a population are ravaged by the effects of chronic non-communicable diseases. The epidemiology, prevalence, patterns, and factors that contribute to it. This article also examines infectious and noncommunicable diseases through the lens of developing countries, the prevalence of its major entity, associated risk factors, management, and challenges. The high prevalence of infectious diseases does not reduce morbidity and mortality of non-communicable diseases. Additionally, this article explores the challenges developing countries face with healthcare systems in managing the burden of the double burden of disease and the strategies to address them in management, prevention, and control. Understanding this concept, its prevalence, and its effect on the health system in developing countries opens pathways to controlling it.

INTRODUCTION

By 2030, it is estimated that the leading cause of death in sub-Saharan Africa would non-communicable diseases. Although around the world, the effects of infectious diseases (IDs) have been reduced, many developing countries are left out of this, which keeps the mortality and morbidity from it very high. With increasing technology and globalization, the adoption of various lifestyles especially the Western lifestyle comes with its effects, which increase the risk and burden of non-communicable diseases (NCDs). A society with an ever-increasing burden in battling IDs and NCDs is called the double burden of disease.¹

HISTORICAL BACKGROUND

In 2016, and 15 years prior, ischemic heart disease and stroke were the leading cause of death globally.² Although in many developing countries, the highest burden was on IDs and pregnancy with its related complication.² With the changes in disease patterns in sub-Saharan Africa, it is estimated that by 2030, NCDs would be the leading cause of death.³ Over the 20 years, the increasing incidence of cardiovascular risk factors has led to a surge in the burden of NCDs.⁴

IMPORTANCE OF STUDYING THE DOUBLE BURDEN OF DISEASE

The effects of the increasing IDs alongside NCDs in the developing world have meant that new ideas to reduce the burden both locally and globally are needed.⁵ In a study done in Nigeria, which revealed the double burden of IDs and NCDs, the pattern of occurrence varied with the age population, with IDs especially respiratory disease and malaria a high cause of morbidity and mortality in children and sepsis, stroke, and liver diseases were leading in adults.²

Diabetes is one of the major NCDs. It is estimated to have 336 million people living with it in low and middle-income countries. It increases the susceptibility to infections and worsens the outcome of infectious diseases like tuberculosis.⁶ Infectious diseases in addition to malnutrition are risk factors for cardiovascular diseases and diabetes.³

Unplanned unsustainable urbanization creates living conditions that are below par, in addition, the adoption of Western diets, reduced physical activities, and air pollution greatly influence the lifestyle of people in developing countries addition to the poor healthcare system increases the risk of NCDs and the burden of ID.^{3,4,7}

NON-COMMUNICABLE DISEASES (NCDs) IN DEVELOPING COUNTRIES

NCDs represent the leading cause of death worldwide, which accounts for 71% of deaths, it encompasses many diseases but 80% of the mortality cuts across four diseases type 2 diabetes, cancer, respiratory distress, and cardiovascular diseases with 1.6, 9.0, 3.9, and 17.9 million deaths respectively.^{4,8} Studies on NCDs in sub-Saharan Africa have largely been hospital-based studies, community studies which are few have shown differences in the risk factors of NCDs in rural and urban communities which were lower in the rural communities.⁷

In a study done in Bangladesh, the risk factors were said to cluster and the prominence increases with age. The high consumption of tobacco and alcohol, reduced food and vegetable servings, reduced physical activities, and an increase in overweight and obesity were significant risk factors.⁹

Obesity, unhealthy lifestyle choices such as a sedentary lifestyle, reduced physical activities, poor diet, cigarette smoking, and alcohol consumption are the six most common risk factors shared by most NCDs. The occurrence of multiple risk factors increases the mortality and morbidity for NCDs, and a healthy lifestyle decreases the chances.¹⁰

In a setting of poor resources, primordial prevention, early detection, and appropriate treatment are the key responses to NCDs in the developing world.⁴

NON-COMMUNICABLE DISEASES AND THEIR BURDEN IN AFRICA

Epidemiological studies play a crucial role in providing valuable data on disease burdens. In the context of disease studies, such as the Global Burden of Disease Study (GBDS), models based on proportionate mortality and disease patterns from various regions have been the primary source of information.¹¹ In sub-Saharan Africa, for instance, the GBDS estimated that non-communicable diseases accounted for 14% of the total disease burden in 1990, with a significant contribution of 30% among adults aged 15-59 years. By 2005, it was projected that malignant neoplasms, particularly those associated with infections such as liver and cervical cancers, would be responsible for 23% of all non-communicable disease-related deaths. Moreover, these figures are anticipated to approximately double by 2020.¹¹

Recent studies have highlighted sub-Saharan Africa as the region with the highest number of deaths attributed to non-communicable diseases. For instance, cardio-vascular diseases accounted for 44% (approximately 1.03 million) of NCD-related deaths in this region. Interestingly, unlike other regions, cerebrovascular disease surpassed ischaemic heart

disease as the leading cause of NCD mortality.¹² These findings underscore the shifting patterns of disease burden and the urgent need to examine the epidemiological perspective of non-communicable diseases in sub-Saharan Africa.

The prevalence of non-communicable diseases (NCDs) in North Africa demonstrates the significant impact of cardio-vascular diseases on mortality. In this region, cardio-vascular diseases account for a substantial 62% of all NCD-related deaths.¹³ Among the various forms of cardio-vascular diseases, ischaemic heart disease emerges as the leading cause, alone contributing to 30% of NCD deaths. Additionally, cerebro-vascular diseases account for approximately 10% of NCD-related deaths in North Africa.¹³

In recent years, there has been a notable shift in the epidemiological landscape of diabetes mellitus in Africa, challenging the previous perception of the continent being relatively unaffected by this disease. The adoption of imported dietary practices and the influence of globalization have contributed to the emergence of diabetes as an epidemic in Africa. Today, the burden of diabetes and its complications is of significant concern, with some epidemiologists predicting that its economic impact and mortality rates may soon surpass the devastating effects of HIV and AIDS.¹⁴

Over the past few decades, the epidemiological landscape of chronic diseases in Africa has witnessed a concerning rise. The prevalence of diabetes mellitus, for instance, has experienced a drastic increase. At the end of 2000, an estimated one million Africans were affected by diabetes, and this number is projected to soar to 18.6 million by 2030.^{15,16} This upward trend highlights the urgent need for an epidemiological perspective to understand the underlying factors, disease patterns, and potential consequences of this diabetes epidemic in Africa.

In addition to diabetes, hypertension has emerged as another significant health challenge on the African continent. The combination of population growth and aging has contributed to a surge in the number of individuals with uncontrolled hypertension. The global prevalence of raised blood pressure in adults aged 25 and over stands at approximately 40%, translating to nearly 1 billion people affected in 2008.¹⁷ Alarming, across the WHO regions, Africa exhibits the highest prevalence of raised blood pressure, affecting 46% of both sexes combined.¹⁷ This epidemiological insight highlights the urgent need for comprehensive studies and targeted interventions to address the growing burden of hypertension in Africa. The epidemiological profile of asthma in Africa has experienced a notable transformation. Historically considered a disease primarily affecting Western populations, asthma is now demonstrating an increasing prevalence on the African continent.¹⁸ The International Study

of Asthma and Allergies in Childhood has provided valuable intercountry prevalence data from seven African countries. Among the English-speaking regions, Ethiopia reported a prevalence rate of 9.1%, Kenya at 15.8%, Nigeria at 13.0%, and South Africa at 20.3%. In the French-speaking regions, Algeria reported 8.7%, Morocco at 10.4%, and Tunisia at 11.9%.¹⁸

While the prevalence rates of asthma in Africa remain lower compared to industrialized countries, it is noteworthy that South Africa approaches rates similar to those found in the United Kingdom.¹⁸ Moreover, a consistent trend has emerged, indicating that rural African regions consistently exhibit significantly lower asthma prevalence rates compared to urban areas.¹⁹ This epidemiological insight highlights the importance of considering both geographical and environmental factors in understanding the distribution and burden of asthma in Africa.

CHALLENGES FOR HEALTH SYSTEMS IN MANAGING DOUBLE BURDEN OF DISEASE

Within the realm of mega-countries including developing countries, a distinct set of common characteristics emerges, encompassing intricate bureaucratic systems, internal diversity in terms of ethnicity, culture, and socioeconomic status, as well as inherent complexities in implementing effective health promotion and education policies across their vast populations.

In an analysis carried out in 2016 on 14 mega-countries including Nigeria, India, Pakistan, Bangladesh and Indonesia, the report findings provided valuable insights into the dynamics of cardiovascular health on a global scale and detailing the characteristics of these countries which are collectively responsible for 64.8% of global cardiovascular mortality. The staggering number of more than 11.2 million deaths annually is attributed to non-communicable diseases (NCDs), particularly in countries at various stages of epidemiological, physical activity, and nutrition transition. These countries, mostly middle-income with low to middle Human Development Index (HDI), are witnessing a shift towards an epidemiological landscape dominated by NCDs, while concurrently grappling with persistently high rates of undernutrition. To effectively combat this double burden, it is crucial to implement well-coordinated intersectoral policies that facilitate access to traditional diets of higher quality, while discouraging the adoption of calorie-rich beverages, ultra-processed foods, and diets high in sugar, fat, and salt.²⁰⁻²² Special attention should be given to promoting breastfeeding and healthy weaning practices, not only to combat undernutrition but also to mitigate the risk of obesity later in life.²³

Drawing from past experiences in developed nations, particularly the United States and Japan, which face similar challenges due to their large populations^{14,24}, valuable lessons can be learned. The recent emphasis on active living and healthier diets, prioritizing basic foods while avoiding junk food, fast food, and sugar-sweetened beverages (SSBs), observed in these countries, can serve as crucial steps toward healthier lifestyles and can be adapted or reinforced in other mega-countries where the transition to unhealthy diets is not yet widespread.^{25,26}

Furthermore, early detection, appropriate treatment, and other interventions to control risk factors such as high blood pressure, cholesterol, and sugar levels need to be analysed and implemented alongside adequate monitoring and evaluation systems. Primary prevention strategies, including the use of statins, antihypertensive drugs, or a polypill, have shown promising results, making investments in exploring these options a priority for countries experiencing a rise in NCDs, particularly among populations with limited or no access to primary healthcare services.²⁷⁻³³ Many mega-countries have already made efforts to reduce tobacco, alcohol, and salt consumption, as well as promote optimal breastfeeding practices and physical activity.^{29,30-33,34-37,38-40,41-44}

Among the most effective measures, taxation on tobacco, alcohol, and SSBs has demonstrated its ability to reduce the consumption of these unhealthy products, serving as a powerful public health tool that complements other strategies aimed at reducing NCDs.⁴⁵⁻⁵⁸ Substantial evidence has also emerged on the benefits of salt reduction in reducing cardiovascular diseases (CVDs).⁵⁹⁻⁶³ Additionally, regulations to decrease the use of other unhealthy ingredients like sugar and saturated/trans fats, improve food labels to facilitate informed consumer choices, control marketing to children, and promote physical activity have been recognized as essential interventions to encourage widespread adoption of healthy lifestyles.⁶⁴⁻⁷⁴

STRATEGIES TO ADDRESS THE DOUBLE BURDEN OF DISEASE IN HEALTH SYSTEMS

In a comprehensive review that examined community-based interventions for heart health in the USA, the results conclusively demonstrate the high degree of generalizability and cost-effectiveness of the community approach in cardiovascular disease (CVD) prevention. These interventions leverage mass communication methods, successfully disseminate information through community networks, and possess the potential to influence environmental, regulatory, and institutional policies that shape health.⁷⁵ Notably, countries with major demonstration projects on heart health

have exhibited significant declines in CVD rates, highlighting the strong association between national progress and major heart health promotion initiatives.

Based on theoretical considerations, review outcomes, and practical experiences, this article puts forward a set of recommendations for non-communicable disease prevention programs. Firstly, successful community intervention programs necessitate a thorough understanding of the community through a comprehensive 'community diagnosis,' fostering close collaboration with various community organizations and ensuring the active participation of community members. Secondly, community-based interventions should combine well-planned media and communication messages with a wide array of community activities involving primary health care services, voluntary organizations, the food industry, supermarkets, workplaces, schools, and the local media.

Furthermore, to yield desirable outcomes, intervention programs require an effective 'dose' of intervention, underscoring the importance of developing cost-effective intervention modalities, particularly in developing countries. The strength of a community intervention program lies in its ability to effect change in the social and physical environments of the community, encouraging the adoption of healthy lifestyles and garnering support for supportive policy decisions. It is imperative to establish a robust monitoring and evaluation system to continuously track the change process and conduct comprehensive evaluations.⁷⁶

Community programs, especially national demonstration projects, not only benefit the target community but also have a broader impact at the national level. Therefore, disseminating the results and evaluation findings widely and maintaining close collaboration with national authorities are crucial components of community interventions. Lastly, given the global burden of non-communicable diseases and the influence of globalization on contemporary lifestyles and health, fostering international collaboration is paramount. Practical networks that share common guidelines, while remaining adaptable to local cultures, have proven to be invaluable, with the World Health Organization (WHO) playing a pivotal leadership role in these networks.⁷⁶

SUMMARY OF KEY POINTS

Over time, developing countries have witnessed a significant rise in the prevalence of major chronic non-communicable diseases (NCDs) and their associated risk factors. Conditions such as hypertension, stroke, and diabetes now affect individuals across all age groups, irrespective of their urban or rural residence, and socioeconomic status. Moreover, the high cost of care exacerbates the burden on the poor,

pushing them further into poverty. Limited lay awareness and knowledge, weak health systems encompassing biomedical, ethnomedical, and complementary practices, and the absence of chronic disease policies further compound the problem. Consequently, the escalating risks, morbidity, and mortality linked to chronic diseases have emerged as critical public health and developmental concerns demanding immediate attention.

In light of these pressing challenges, it is imperative to chart new directions in research, practice, and policy to effectively address the burden of chronic diseases in these countries. This necessitates the establishment of active partnerships between researchers, policymakers, industry stakeholders, patient groups, civil society organizations, the government, and development partners. Collaborative efforts should focus on developing comprehensive strategies that integrate preventive measures, early detection, and effective management of chronic NCDs.

To tackle the growing burden, research initiatives should explore innovative approaches to enhance understanding of the epidemiology, risk factors, and determinants of NCDs specific to the context of these countries. Evidence-based practices should be implemented to improve healthcare delivery systems and empower healthcare professionals to provide comprehensive care for chronic conditions. Additionally, the development and implementation of robust chronic disease policies are crucial to guide and support the delivery of quality healthcare services.

Recognizing the need for multi-sectoral engagement, partnerships with various stakeholders should be fostered. These partnerships can facilitate resource mobilization, knowledge exchange, and capacity building initiatives to strengthen healthcare systems and promote sustainable interventions. Furthermore, collaboration with patient groups and civil society organizations can help drive community-based awareness campaigns, facilitate patient support networks, and advocate for policy changes that prioritize chronic disease prevention and management.

In conclusion, the escalating burden of chronic NCDs in developing countries demands urgent action and a comprehensive response from all stakeholders. By forging collaborative partnerships and embracing new directions in research, practice, and policy, these countries can address the challenges posed by chronic diseases, improve population health outcomes, and foster sustainable development.

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