

# Expanding the definition of noncommunicable disease

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## ABSTRACT

Noncommunicable diseases (NCDs) are responsible for 68% of all deaths in 2012. Eighty-two percent of these “premature” deaths occurred in low- and middle-income countries. Most of the NCD deaths are caused by cardiovascular diseases, cancer, diabetes, chronic respiratory diseases, mental health, road traffic accidents, and violence. The World Health Organization, several governments, and nongovernmental organizations have taken up numerous programs to curb the menace of NCDs. However, the present programs do not include some common chronic medical conditions which also lead to considerable morbidity and mortality. The present review highlights three important chronic disorders: chronic kidney disease (CKD), liver disease (cirrhosis and nonalcoholic fatty liver), and thyroid diseases. CKD is an internationally recognized public health problem affecting 5–10% of the world population. CKD resulted in 956,000 deaths in 2013 and proposes them to be included in the world wide accepted definition of NCD. Cirrhosis and chronic liver disease were the tenth leading cause of death for men and the twelfth for women in the United States in 2001. Moreover, 4–10% of the global population have thyroid dysfunction. This mini-review proposes to expand the definition of NCD to include these three major illnesses.

**Key words:** Chronic kidney disease, nonalcoholic fatty liver, noncommunicable disease, thyroid disease

## INTRODUCTION

Noncommunicable diseases (NCDs), also known as chronic diseases, are not transmissible from person to person. They are of long duration and generally progress slowly.<sup>[1]</sup> They are also referred to as a “lifestyle” disease because the majority of these diseases are preventable illnesses with risk factors include tobacco use (smoking), alcohol abuse, poor diets (high consumption of sugar, salt, saturated fats, and trans fatty acids), and physical inactivity. NCD kills 36 million people a year, a number that by some estimates are expected to rise by 17–24% within the next decade.<sup>[2]</sup>

All age groups and all regions of the world are affected by NCDs. In 2012, they cause 68% of all deaths (38 million)

up from 60% in 2000.<sup>[3]</sup> About half were under age 70, and half were women.<sup>[4]</sup> Eighty-two percent of these “premature” deaths occurred in low- and middle-income countries.<sup>[1]</sup> Most of the NCD deaths are caused by cardiovascular diseases (CVDs), cancer, diabetes, chronic respiratory diseases (CRDs), mental health, road traffic accidents, and violence.<sup>[5]</sup>

Tobacco accounts for around 6 million deaths every year (including from the effects of exposure to second-hand smoke) and is projected to increase to 8 million by 2030. About 3.2 million deaths annually can be attributed to insufficient physical activity.<sup>[6]</sup> More than half of the

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3.3 million annual deaths from harmful drinking are from NCDs.<sup>[11]</sup> In 2010, 1.7 million annual deaths from cardiovascular causes have been attributed to excess salt/sodium intake.<sup>[7]</sup> Elevated blood pressure is attributed to 18% of global deaths.<sup>[6]</sup>

These diseases are driven by forces that include aging, rapid unplanned urbanization, and the globalization of unhealthy lifestyles. Globalization of unhealthy lifestyles such as unhealthy diets may show up in individuals as raised blood pressure, increased blood glucose, elevated blood lipids, and obesity.<sup>[11]</sup>

In India, according to the recent statistics on NCDs, 53% of the deaths were due to NCDs. CVDs alone account for 24% of all deaths. CRDs, cancers, and diabetes accounted for 11%, 6%, and 2% of all deaths, respectively.<sup>[8]</sup> In 2004, NCDs accounted for 40% of all hospital stays and 35% of all outpatient visits in India.<sup>[9]</sup> In addition, chronic diseases are estimated to account for 53% of all deaths and 44% of disability-adjusted life-years lost in 2005.<sup>[10]</sup>

## WHAT ARE THE SOCIOECONOMIC IMPACTS OF NONCOMMUNICABLE DISEASES?

Previously, chronic NCDs were considered a problem limited mostly to high-income countries while infectious diseases seemed to affect low-income countries. The burden of disease attributed to NCDs has been estimated at 85% in industrialized nations, 70% in middle-income nations, and nearly 50% in countries with the lowest national incomes.<sup>[11]</sup> There are 7 trillion dollars projected economic losses estimated from NCDs in low- and middle-income countries.<sup>[5]</sup>

Countries are reportedly suffering significant losses in national incomes because of premature deaths or inability to work resulting from heart disease, stroke, and diabetes. For instance, China was expected to lose roughly \$558 billion in national income between 2005 and 2015 due to early deaths. In 2005, heart disease, stroke, and diabetes caused an estimated loss in national income of 9 billion dollars in India and 3 billion dollars in Brazil.<sup>[11]</sup>

As of 2005, India experienced the highest loss in potentially productive years of life worldwide.<sup>[12]</sup> The projected cumulative loss in Indian national income due to NCD mortality for 2006–2015 is expected to be 237 billion dollars. By 2030, this productivity loss is expected to double to 17.9 million years lost.<sup>[13]</sup>

In collaboration with World Health Organization (WHO), more than 190 countries agreed in 2011 on global

mechanisms to reduce the avoidable NCD burden including a Global Action Plan for the prevention and control of NCDs 2013–2020. The aim is to reduce the number of premature deaths from NCDs by 25% by 2025 through nine voluntary global targets. The focus is in addressing risk factors such as tobacco use, harmful use of alcohol, unhealthy diet, and physical inactivity that increase NCDs.<sup>[11]</sup>

In India to tackle the problem of NCD several programs is being implemented by the Government of India. These include National Program for Prevention and Control of Cancer, Diabetes, Cardiovascular Diseases and Stroke, National Programme of Health Care of Elderly, National Iodine Deficiency Disorders Control Programme, National Programme for Control of Blindness, National Mental Health Programme, and National Programme for Prevention and Control of Deafness.<sup>[14]</sup>

However, there are several common diseases which are not included in the WHO priority list. These diseases can also lead to considerable morbidity and mortality.

## CHRONIC KIDNEY DISEASE

Chronic kidney disease (CKD) is an internationally recognized public health problem affecting 5–10% of the world population.<sup>[15,16]</sup> CKD resulted in 956,000 deaths in 2013 up from 409,000 deaths in 1990.<sup>[17]</sup> In Canada, 1.9–2.3 million people have CKD.<sup>[18]</sup> The U.S. Centers for Disease Control and Prevention found that CKD affected an estimated 16.8% of U.S. adults aged 20 years and older, during 1999–2004.<sup>[19]</sup> UK estimates suggest that 8.8% of the population of Great Britain and Northern Ireland have symptomatic CKD.<sup>[20]</sup> A study from Delhi reported a 0.78% prevalence of chronic renal failure in adults.<sup>[21]</sup>

Although it is not currently identified as one of the WHO's main target for global NCD control, there is compelling evidence that it is common, harmful but treatable. It is also a major contributor to the incidence and outcome of at least three of the diseases targeted by the WHO that is diabetes, hypertension, and CVD.<sup>[22]</sup> CKD strongly predisposes to hypertension and CVD.

## LIVER DISEASE

Cirrhosis and chronic liver disease were the tenth leading cause of death for men and the twelfth for women in the United States in 2001, killing about 27,000 people each year.<sup>[23]</sup> Cirrhosis has a 10-year mortality of 34–66%, largely dependent on the cause of the cirrhosis; alcoholic cirrhosis has a worse prognosis than primary biliary cirrhosis and cirrhosis due to hepatitis.<sup>[24]</sup>

Nonalcoholic fatty liver disease (NAFLD) is the most common liver disorder in developed countries.<sup>[25,26]</sup> Up to 80% of obese people have the disease.<sup>[27]</sup> The National Health and Nutrition Examination Survey found a 30% rate of NAFLD in the United States between 2011 and 2012.<sup>[28]</sup> The percentage of people with NAFLD ranges from 9% to 36.9% in different parts of the world.<sup>[29-31]</sup> Approximately, 20% of the United States population have nonalcoholic fatty liver, and the number of people affected is increasing.<sup>[32]</sup>

Nonalcoholic steatohepatitis (NASH) is the most extreme form of NAFLD and is regarded as a major cause of cirrhosis of the liver of unknown etiology.<sup>[33]</sup> NASH is a progressive disease with up to 20% of patients with NASH developing cirrhosis of the liver over 10 years, and 10% will suffer death related to liver disease.<sup>[34]</sup>

The prevalence of the disease is estimated to be around 10–30% in the general Indian population, with a higher incidence rate among obese and diabetic patients.<sup>[35,36]</sup> The prevalence is much higher among patients with metabolic syndrome; 15–80% among obese people, 25–60% in patients with dyslipidemia, and 33–55% in prediabetics and diabetics are reported to have NAFLD.<sup>[37]</sup>

## THYROID DISEASE

In a population-based study done in Cochin on 971 adult subjects, the prevalence of hypothyroidism was 3.9%. The prevalence of subclinical hypothyroidism was 9.4%. Subclinical and overt hyperthyroidism were present in 1.6% and 1.3% of subjects studied.<sup>[38]</sup> In a study of Hashimoto's thyroiditis in India, 6283 schoolgirls from all over the country were screened. Goiter was seen in 1810 schoolgirls and 764 of them underwent a fine needle aspiration cytology, and of these subjects, 58 (7.5%) had evidence of juvenile autoimmune thyroiditis. Among those with juvenile autoimmune thyroiditis, subclinical and overt hypothyroidism were seen in 15% and 6.5%, respectively.<sup>[39]</sup>

Patients with diabetes mellitus have higher prevalence of thyroid dysfunction. Diabetes and primary hypothyroidism are common companions as suggested by the 11–20% concordance of both endocrine disorders in a large cohort study. This is substantially higher than the reported 4% prevalence of hypothyroidism alone in the general Western population.<sup>[40,41]</sup> In a study of 202 type 2 diabetes mellitus at Imphal, 16.3% have subclinical hypothyroidism, 11.4% have hypothyroidism, 2% have subclinical hyperthyroidism, and 1.55 are hyperthyroid.<sup>[42]</sup>

The presence of undiagnosed hypothyroidism may increase the risk of CVD by aggravating dyslipidemia, insulin resistance, obesity, and vascular endothelial dysfunction.<sup>[43,44]</sup>

## CONCLUSION

NCD are a common cause of morbidity and mortality across the globe with the major burden on middle- and low-income countries. The WHO and several governmental and nongovernmental organizations have launched several programs to tackle the risk factors for these. However, all these have ignored some very common chronic diseases which also can lead to significant morbidity and/or mortality. So rather than focusing on four main types of NCDs, i.e., CVDs (like heart attacks and stroke), cancers, CRDs (such as chronic obstructed pulmonary disease and asthma), and diabetes; the definition of NCD should also encompass other common chronic noninfectious diseases like thyroid disorders, kidney disease, and chronic liver disease.

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