The Threat of Non-Communicable Diseases: Strategies to Mitigate & Rise up to the Modern Public Health Challenge

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Abstract—*With the socio-economic development the disease profile of nations has witnessed a transition from predominantly communicable/infectious to chronic non-infectious or non-communicable diseases and by now they are the major cause of death globally, responsible for 38 million (68%) of the 56 million deaths that occurred in 2012. India is also following the trend and these diseases have been found to be the leading cause of death claiming 53% of total deaths. Once associated with rich, industrialized nations, chronic diseases are now the leading causes of death in the developing world, as well. Moreover, they have been found to be more fatal in low and middle income countries; 80% chronic disease deaths occur in low and middle income countries, where most of the world's population lives. Interestingly, most of these premature deaths are largely preventable. It has been estimated that by 2020, chronic diseases will account for almost three-quarters of all deaths worldwide. Efforts are being taken at all levels in order to halt the NCD epidemic. The WHO has envisaged the global action plan for prevention and control of non-communicable diseases, which is to be monitored as per global monitoring framework. Apart from India being the first to adapt to this, several steps have been taken to halt this epidemic such as National Program for control of cancer, diabetes, cardiovascular diseases, and stroke (NPCDCS). Involvement of Primary health care system aimed at attacking the common risk factors, is the corner stone for prevention of these diseases.*

1. INTRODUCTION

Historically, epidemics of communicable diseases were the main causes of morbidity and mortality in all countries of the world until the later part of the 19th century [1]. Owing to the public health improvements such as housing, sanitation, water supply, development of antibiotics and vaccines; mortality and morbidity from these diseases have dramatically decreased, initially in developed than in developing countries. Paradoxically, there has been a remarkable increase in the prevalence of risk factors for Non-communicable Disease (NCDs) such as type 2 diabetes, cardio-vascular diseases, hypertension, and strokes [2]. By the turn of 21st century, populations worldwide were transformed due to forces of global change such as urbanization, industrialization, migration and economic instability which threatened a dramatic expansion of coronary heart diseases [3]. These changes are considered to be a result of epidemiologic transition model which hypothesises that the disease profile of a population changes from the predominantly infectious communicable diseases to the non-infectious chronic diseases, as the nation develops economically [4].

These chronic (non-communicable) diseases—including cardio-vascular diseases, cancer, chronic respiratory diseases, and diabetes—are now leading causes of death and disability world-wide [5]. Also the prevalence of these diseases is showing an upward trend in most countries and it is likely to increase due to several reasons such as growing of the populations and rapidly changing behavioral and life-style patterns of the people [6]. Because of increase in life expectancies in most countries due to better and more available healthcare, chronic disease prevalence is increasing [7]. Ageing of the world's population has been identified as one of most important factor for deciding the health trends in next 25 years [8]. In order to draw attention and resources to this problem World heart foundation in 2000 has identified the coronary heart disease as an "impending global epidemic" [9]. About 82% of all NCD deaths are because of cardio vascular diseases, cancer, respiratory diseases and diabetes [10].

2. GLOBAL BURDEN

Non-communicable diseases are responsible for 38 million (68%) of the 56 million deaths that occurred in 2012 [10], whereas they were estimated to be responsible for 35 million deaths globally in 2005, irrespective of all ages, nationalities, and socioeconomic levels [11]. As populations will age, annual non-communicable deaths are estimated to increase to 52 million in 2030 and the greatest increase is expected to be seen in low and middle-income regions [12]. By then, about 76% of the deaths in the world will be due to non-communicable diseases (NCDs) [5]. It is projected that the annual number of deaths due to cardio-vascular disease will increase to 25 million in 2030 which was 17 million in 2008 [12].

3. DIFFERENCE BETWEEN DEVELOPED AND DEVELOPING COUNTRIES

Many economically advanced nations have achieved major reductions in the toll of chronic diseases, for instance a decline of 60% in age-adjusted death rates from cardio-vascular diseases was noted in the 1970s in United States [13, 14]. Steep decline in coronary heart disease mortality has been noted in Finland in the late 1970s [15]. Paradoxically the burden of disease is still rising, for example heart disease and stroke are the leading cause of death in United States of America [16].

Once associated with rich, industrialized nations, chronic diseases are now the foremost causes of death in the developing world [17]. The burden of non-communicable diseases is rapidly increasing in low-income and middle-income countries which is causing adverse social, economic, and health effects [10]. With emerging epidemic of non-communicable diseases in the background of infectious diseases, developing countries are now facing double burden [18].

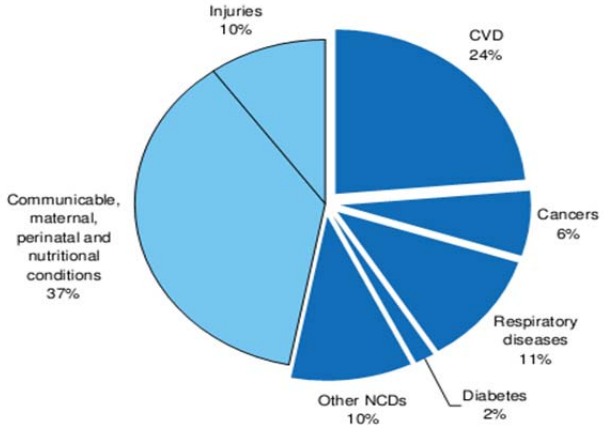
NCDs also kill at a younger age in low and middle-income countries where 29% of NCD deaths occur among people under the age of 60 years, compared to 13% in high-income countries [12]. Only 20% of total deaths due to chronic disease are from the high income countries while 80% occur in low and middle income countries, where most of the world's population live [12]. About 82% NCD death that occur before the age of 70 years are from low and middle income countries [10].

It has been estimated that by 2020, chronic diseases will account for almost three-quarters of all deaths worldwide and that 71% of deaths due to ischemic heart disease, 75% of deaths due to stroke, and 70% of deaths due to diabetes will occur in developing countries [8]. Over the next 30 years, the burden of disease from NCDs in developing and is expected to rise by more than 60%. In comparison, increase in developed countries is expected to be less than 10% [5]. In low and middle income countries non-communicable diseases will be responsible for three times as many DALYs and five times as many deaths as communicable diseases, maternal, perinatal and nutritional conditions combined [12]. In the poorest countries, the deaths and disability from chronic diseases comprises 49% which clearly exceed that from communicable diseases, estimated to be about 40% [19].

4. BURDEN OF NON-COMMUNICABLE DISEASES IN INDIA

India, as in other low and middle income countries, is experiencing a rapid health transition, with ever increasing burden of non-communicable diseases (including cardiovascular and respiratory diseases, mental disorders, diabetes, and cancers) against the continued burden of communicable and nutrition-related diseases [20]. In the capital of India, New Delhi, largely an urban area, the prevalence of coronary artery disease has increased nine-fold over the years [21, 22].

According to **Causes of Death Survey (2001-03)** conducted by the Registrar General of India, non-communicable diseases were found to be the leading causes of death in the country, constituting 42% of all deaths. In 2004, deaths due to non-communicable diseases in India were twice those from communicable diseases [23]. As of 2005, India experienced the "highest loss in potentially productive years of life" globally and the main cause of mortality was cardiovascular disease, mostly affecting people aged 35- 64 years [24]. Fig. 1 shows the proportional mortality rates in India, as estimated by WHO Global Status Report (2011). These diseases including cardiovascular diseases, respiratory diseases, cancer, diabetes and others, are estimated to account for about 53% of all death in India [12].



Source: WHO (2011), non-communicable diseases by country profile, India.

Fig. 1: Proportional Mortality Rate (% of total Death, all ages)

It has been projected by the Global Burden of Disease Study that the number of deaths attributable to chronic diseases would account for 66.7% of all deaths in 2020 [8]. Currently they have been estimated to account for slightly less than three-quarters of all deaths in India by 2030 [25].

5. PREVENTION AND CONTROL OF THE COMMON RISK FACTORS: BASIS FOR PREVENTION OF NCDS

These diseases have now reached epidemic, yet they could be significantly reduced with millions of lives saved and through controlling their risk factors, early detection and timely treatment [12]. The major behavioral risk factors identified by World Health Report 2002 are; tobacco use, harmful alcohol consumption, unhealthy diet (low fruit and vegetable consumption) and physical inactivity. While overweight and obesity, raised blood pressure, raised blood glucose, abnormal

blood lipids and its subset raised total cholesterol have been identified as major biological risk factors [26].

In India, the cardiovascular diseases and coronary risk factors such as hypercholesterolemia, hypertension, diabetes mellitus and sedentary lifestyle are associated with higher social classes in both sexes, while smoking is associated with lower social classes [27]. A positive association between overweight and higher socio-economic status has been reported in more than 50 developing countries [28]

A combined effort to modify health behaviors certainly has positive outcomes on the disease burden for cardio-vascular disease (heart disease and stroke), cancer, diabetes, respiratory diseases, and many other conditions because of the shared impact of these risk factors [29]. Example of Turkey can be cited here which have achieved 13% decline in smoking rates by enforcing the legislative control on tobacco products [30].

It has been estimated that potentially 32 million deaths from chronic diseases could be averted in 10 years in 23 low income and middle-income countries that have a high burden of such diseases if global partners were to adopt three cost-effective interventions on tobacco, salt intake and hypertension [31].

6. WHO GLOBAL ACTION PLAN FOR THE PREVENTION AND CONTROL OF NCDS.

Considering the huge impact of NCDs across the globe, the world health Organization has envisaged the Global Action Plan for the prevention and control of these diseases with the vision of "a world free of the avoidable burden of non-communicable diseases". The Global action plan (2013-2020) seeks to attain its goal through multi-sectoral collaboration and cooperation at national, regional and global levels by setting 9 global targets [32] which include; 1) A 25% relative reduction in the risk of pre mature mortality from cardio vascular diseases, cancer, respiratory diseases and diabetes. 2) At least 10% relative reduction in the harmful use of alcohol, as appropriate, within the national context. 3) A 10% relative reduction in prevalence of insufficient physical activity. 4) A 30% relative reduction in mean population intake of salt/sodium. 5) A 30% relative reduction in prevalence of current tobacco use in persons aged 15+ years. 6) A 25% relative reduction in the prevalence of raised blood pressure or contain the prevalence of raised blood pressure, according to national circumstances. 7) Halt the rise in diabetes and obesity. 8) At least 50% of eligible people receive drug therapy and counselling (including glycaemic control) to prevent heart attacks and strokes. 9) An 80% availability of the affordable basic technologies and essential medicines, including generics, required to treat major non-communicable diseases in both public and private facilities.

7. RESPONSE BY INDIA

Indian government has taken various initiatives to halt the epidemic of NCDs in the country. India is the first country to respond to the WHO by adapting to global framework network on NCDs, the country specific targets and indicators has been developed [33]. India is already a signatory to WHO Framework convention on Tobacco Control (FCTC).

7.1 Non-Communicable Disease Risk Factors Survey

As a component of Integrated Disease Surveillance Project (IDSP), the periodic community based surveys of population 15-64 years is being carried out in phased manner. The main aim is to provide baseline data on the risk factors of non-communicable diseases as per WHO Steps Approach. The first phase of the survey included seven states namely Andhra Pradesh, Kerala, Madhya Pradesh, Maharashtra, Mizoram, Tamil Nadu and Uttarakhand [34].

7.2 National Programme on Prevention and Control of Cancer, Diabetes, Cardio-Vascular Diseases and Stroke (NPCDCS)

This is initiative taken by the government of India to prevent and control common NCDs through behavior and life style changes by providing early diagnosis and management services for common NCDs. It seeks to build capacity at various levels of health care for prevention, diagnosis and treatment of common NCDs. The provision for training of human resource within the public health setup viz doctors, paramedics and nursing staff to cope with the increasing burden of NCDs [35].

8. CONCLUSION

The epidemiologic transition as a consequence to socio-economic development has put the Non-communicable diseases on the center stage of global mortality and morbidity. The presence of these diseases in also being felt in the lower socio-economic section of the developing countries. It's high time that concerted efforts should be taken at all levels to halt the epidemic.

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