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Review Article

Non-Communicable Diseases and Their Risk Factors: Review

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Abstract: Non-Communicable Diseases (NCDs) are also termed chronic diseases. NCDs are collectively responsible for 71% of all deaths worldwide. Almost three quarters of all NCD deaths, and 82% of the 16 million people who died prematurely, or before reaching 70 years of age, occur in low- and middle-income countries. NCDs also account for 48% of the healthy life years lost (Disability Adjusted Life Years–DALYs) worldwide (versus 40% for communicable diseases, maternal and perinatal conditions and nutritional deficiencies, and 1% for injuries). Non-communicable diseases are the leading cause of death worldwide than all other causes combined. Contrary to what people generally believes, almost 80% of NCDs deaths occur in low & middle income countries. India is experiencing a rapid health transition from communicable to non-communicable diseases. According to World Health Organization an Indian today has over twice the odds of dying of a non-communicable disease than a communicable disease. An increasing trend in NCDs risk factors has been observed globally during the two decades from 1990 to 2010; blood pressure (27% increase), smoking (3% increase), alcohol use (28% increase), low fruit (29% increase), high body-mass index (82% increase), and high fasting plasma glucose (58% increase). An increase in such risk factors may lead to raised NCDs' burden.

Keywords: Non-communicable diseases, Risk factors, Cardiovascular.

INTRODUCTION

For hundreds of years, communicable diseases or infectious diseases were the main causes of death worldwide. Uncontrolled epidemics were the main threat to life expectancy. As the world entered the new millennium, with medical research achievements in terms of vaccination, antibiotics and improvement of life conditions, non-communicable diseases (NCDs) started taking place in industrialized countries. Cardiovascular diseases, cancer, diabetes, chronic pulmonary and mental diseases became a real burden for health systems in developed countries. The four main types of NCDs are cardiovascular diseases, cancers, chronic respiratory diseases and diabetes. Ageing, urbanization, and unhealthy lifestyles are some of the factors driving these diseases. The vulnerability of NCDs and risk factors is spread over all age groups including Children, adults and the elderly .There is a shift noticed from communicable diseases in children to NCDs in adults globally. For a while, these diseases were associated with economic development and so called diseases of the rich and affluent societies. Then, by the dawn of the 21st century, NCDs were appeared sweeping the entire globe, with an increasing trend in developing countries where the transition imposes more constraints to deal with the double burden of infective and non-infective diseases in a poor environment characterized by ill-health systems. In 1990, the leading causes of disease burden were pneumonia, diarrhoeal diseases and perinatal conditions. By 2020, it is predicted that NCDs will account for 80 percent of the global burden of disease, causing seven out of every 10 deaths in developing countries, compared with less than half today [Boutayeb A. & Boutayeb S. (2005)].

In the developing countries, non-communicable diseases are also emerging as a major public health concern, and this is believed to be an attribute of the effects of industrialization, e.g. adoption of a sedentary lifestyle, poor nutrition, cigarette smoking and risky alcohol intake, coupled with improved health care in infection control and improved general mean life expectancy [Yusuf, Reddy, Ouupun and Anand (2001)].

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The major causes of morbidity and disability in the developing countries have shifted from a predominance of nutritional deficiencies and infectious diseases to noncommunicable diseases (Yusuf S. *et al*., 2001). This became evident when approximately 75% of the total global individual non-communicable disease cases were recorded in the developing countries (WHO, 2005a). "The rapidly growing burden of NCDs in developing countries is not only accelerated by population ageing; it is also driven by the negative effects of globalization, for example, unfair trade and irresponsible marketing, rapid and unplanned urbanization and increasingly sedentary lives. People in developing countries eat foods with higher levels of total energy. Increasing NCD levels are being influenced by many factors including tobacco use and availability, cost and marketing of foods high in salt, fat and sugar. A considerable proportion of global marketing targets children and adolescents as well as women in developing countries to promote tobacco smoking and consumption of 'junk' food and alcohol. Rapid, unplanned urbanization also changes people's way of living through more exposure to the shared risk factors. NCDs are exacerbated in urban areas by changes in diet and physical activity, exposure to air pollutants (including tobacco smoke) and harmful use of alcohol. Overwhelmed by the speed of growth, many governments are not keeping pace with ever-expanding needs for infrastructure and services and people are less likely to be protected by interventions like smoke-free laws, regulations to phase out trans-fats, protections against harmful use of alcohol, and urban planning to promote physical activity". WHO (2010).

As a consequence, vulnerable and socially disadvantaged people get sicker and die sooner than people of higher social positions; the factors determining social positions include education, occupation, income, gender and ethnicity. There is strong evidence on the links between poverty and lower life expectancy, and on the associations between a host of social determinants, especially education, and prevalent levels of NCDs: people of lower social and economic positions fare far worse in countries at all levels of development. While measuring the economic impacts of NCDs remains a relatively complex and under-developed discipline, they invariably affect low- and middle-income countries and households more severely because they have the least financial cushion to withstand the economic consequences of NCDs.

NCDs and their risk factors often prevent people from working or seeking employment, thus robbing families of income. A recent analysis by the World Economic Forum estimated that countries such as Brazil, China, India and the Russian Federation currently lose more than 20 million productive life years annually to NCDs. On average, 10 days are lost per employee per year due to NCDs and injuries in the Russian Federation. Annual income loss from NCDs, arising from days spent ill and in care-giving efforts, amounted to US$ 23 billion (0.7% GDP) in India in 2004. In the Province of Taiwan, China, the probability of being in the labour force was reduced by 27% by cardiovascular disease and 19% by diabetes. Studies in China showed that tobacco use increased the odds of sick leave by between 32% and 56%.

Studies from India show that the contribution to poverty of high out-of-pocket expenditure for health care and NCDs is significant. An estimated 1.4 million to 2 million Indians experienced catastrophic spending in 2004 and 600 000 to 800 000 people were impoverished by the costs of caring for cardiovascular disease and cancer. The findings of another study also reveal that one of every four families living in the world's poorest countries borrows money or sells assets to pay for health care [Thakur J. S. *et al*. (2011)].

The disease profile of the world is changing at an astonishingly fast rate, especially in low and middle income countries. Long held notions about the nature of chronic diseases, their occurrence, the risk factors underlying them and the populations at risk are no longer valid. The WHO's released "Global Status Report on Non-Communicable Diseases 2010" leaves no doubt that NCDs are the leading cause of death worldwide than all other causes combined. Contrary to what people generally believe, there is different story depicted by available data that shows practically 80% of deaths occur in low- and middle-income countries. NCDs were known to be "rich people's disease". But today people of low and middle income groups are more affected by NCDs than upper income countries people. In low and middle income countries, deaths under age of 60 are more than double that of high income countries (29 % in LMICs and 13 % in HICs).

As reported by Institute for Health Metrics and evaluation (IHME), the burden of diseases estimates for India indicates increasing trends of NCDs and their risk factors from 2005-2016: ischemic heart disease (53.0%), COPD (22.7%), cerebrovascular disease (25.1%), diabetes mellitus (70.5 %), chronic kidney disease (36.4%) high blood pressure (34.6%), high fasting plasma glucose (16.2%), high total cholesterol (42.0%), high body-mass index (71.2%), dietary risks (30.7%), alcohol & drug use (16.6%).

According to WHO's Global Health Observatory data, the leading causes of NCD deaths in 2012 were CVDs (17.5 million deaths, or 46% of all NCD deaths), cancers (8.2 million, or 22% of all NCD deaths), & respiratory diseases, including asthma & chronic obstructive pulmonary disease (4.0 million). Diabetes caused another 1.5 million deaths. Further this report depicts that NCDs were responsible for 38 million deaths out of total 56 million deaths. In 2012 nearly half of NCD deaths in low-&-middle income countries were occurred before the age of 70. 80% of

premature heart disease, stroke & diabetes can be prevented.

Cardiovascular disease is the number one killer disease among all the chronic diseases and mostly affecting the most productive age group 35-64. World Health Organisation report shows that in 2000, 9.2 million years of productive life were lost in India, which translates into USD 9 billion of lost national income. The projected cumulative loss of national income for India due to NCDs mortality for 2006-2015 will be USD237 billion. By 2030, it was expected that productivity loss to double to 17.9 million years lost, almost 1000% greater than the corresponding loss in the U.S., which has a population a third the size of India's population.

There are many risk factors associated with NCDs and its rising burden. A risk factor refers to any attribute, characteristic, exposure of an individual which increases the likelihood of developing a chronic non communicable disease. By measuring the risk factors an attempt is being made to predict the future distribution of NCDs in a population. This type of information is vital to promoting disease prevention and control programmes. The high incidence of NCDs and risk factors is very much related to growing life style changes. Such changes are more significant in affluent societies; each of these risk factor increases the risk for NCDs through independent mechanisms. In spite of being related to each other the occurrence of one risk factor makes way for another leading to greater risk for developing NCDs. The future trends of non-communicable diseases largely depend on the present exposure level of the population to its risk factors. The risk factors accumulate through the years and give rise to the NCDs in the future. All the major risk factors for non-communicable diseases have been well established and it has also been suggested that they are responsible for almost all the cases of non-communicable diseases. These risk factors leading to NCDs are largely modifiable and can be monitored. The increasing prevalence of NCDs around the countries is thought to be due to the change in the demographic profile of the population. The increase in the number of aging population and better child survival as a result of economic upliftment and better health care have been identified as the major reason for this change in demographic profile. World health Organization (WHO) has declared NCDs as a growing threat globally especially in developing countries as an extra burden due to NCDs over other communicable diseases in such developing countries. Out of the total 60% of deaths due to NCDs, 80% occur in developing countries. NCDs are responsible for maximum number of deaths in working age group globally affecting more of younger age group in poor countries than in the rich countries. It suggests that the potential of young workers of a poor country becomes unavailable due to the higher incidence of NCDs among them pointing to the seriousness of the situation.

Four main diseases are generally considered to be dominant in NCD mortality and morbidity: cardiovascular diseases (including heart disease and stroke), diabetes, cancer and chronic respiratory diseases (including chronic obstructive pulmonary disease and asthma)-**Cancer, Cardiovascular Disease, Chronic Respiratory Disease, Diabetes.**

The rapidly increasing burdens of NCDs in the developing countries have thus contributed significantly to the increasing poverty in these regions. Prevalence of NCDs in these countries is also a major barrier in developmental and poverty reduction initiatives. This threat of NCDs is a major challenge in the path of achieving Millennium development goals (MDGs). The greater risk of socially disadvantaged people getting exposed to harmful products, like tobacco, unhealthy food, having limited access to health services makes them victims of morbidities and mortalities of NCDs faster than people of higher socio economic status. Thus NCDs also creates an increase in social inequalities by affecting poorer people. In spite of its great relevance taking into account its contribution to the major portion of the global disease burden, chronic diseases have not been given the necessary attention (Shamim Begam N (2013).

An increasing trend in NCDs risk factors has been observed globally during the two decades from 1990 to 2010; blood pressure (27% increase), smoking (3% increase), alcohol use (28% increase), low fruit (29% increase), high body-mass index (82% increase), and high fasting plasma glucose(58% increase). An increase in such risk factors may lead to raised NCDs' burden. Risk factors of NCDs fall into two categories; modifiable risk factors and non-modifiable risk factors. Non modifiable risk factors cannot be reduced or prevented by intervention. These are age, sex, ethnicity, family history. Modifiable risk factors are those risk factors which can be reduced or prevented by intervention, thereby reducing the probability of disease. To a large extent, NCDs are attributed to four major behavioural risk factors that are pervasive aspects of economic transition, rapid urbanization and 21st centaury lifestyles namely tobacco use, harmful consumption of alcohol, physical inactivity & unhealthy diet (low consumption of fruits and vegetables). WHO (2010).

The major effects of these behavioural risk factors fall increasingly on lowand middle- income countries, mirroring the underlying social determinants. A vicious cycle may ensue among these populations; poverty leads to behavioural risk factors for NCDs and in turn results in NCDs, which may become an important carrier to the downward spiral that again

leads families towards poverty. These four behavioural risk factors may lead to four metabolic/physiological risk factors overweight or obesity, high blood pressure or hypertension, high cholesterol and high blood sugar. In terms of attributable deaths, the leading NCD risk factor globally is raised blood pressure (to which 13% of global deaths are attributed), followed by tobacco use (9%), raised blood glucose (6%), physical inactivity (6%), and overweight & obesity (5%). WHO (2010).

CONCLUSION

Non-communicable diseases are identified by WHO as "Group II Diseases," a category that aggregates (based on ICD-10 code) the following conditions/causes of death: Malignant neoplasms, other neoplasms, diabetes mellitus, endocrine disorders, neuropsychiatric conditions, sense organ diseases, cardiovascular diseases, respiratory diseases (e.g. COPD, asthma, other), digestive diseases, genitourinary diseases, skin diseases, musculoskeletal diseases (e.g. rheumatoid arthritis), congenital anomalies (e.g. cleft palate, down syndrome), and oral conditions (e.g. dental caries). These are distinguished from Group I diseases (communicable, maternal, perinatal and nutritional conditions) and Group III diseases (unintentional and intentional injuries). Non-modifiable Risk Factors refer to characteristics that cannot be changed by an individual (or the environment) and include age, sex, and genetic make-up. Although they cannot be the primary targets of interventions, they remain important factors since they affect and partly determine the effectiveness of many prevention and treatment approaches. Modifiable Risk Factors refer to characteristics that societies or individuals can change to improve health outcomes. WHO typically refers to four major ones for NCDs: poor diet, physical inactivity, tobacco use, and harmful alcohol use.

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