

PREVENTION AND CONTROL OF NONCOMMUNICABLE DISEASES

N.P. Napalkov

Director Emeritus, Petrov Institute of Oncology, St. Petersburg, Russian Federation

Keywords: Prevention, disease control, rehabilitation, risk factors, epidemiological transition, environment, disease burden, aging, health expectancy, community health, lifestyles, noncommunicable diseases, cancer, cardiovascular diseases, diabetes, mental and neurological disorders

Contents

1. Introduction
 2. Chronic Noncommunicable Diseases and World Health
 - 2.1. Epidemiological (Health) Transition
 - 2.2. Cardiovascular and Cerebrovascular Diseases
 - 2.3. Cancer
 - 2.4. Chronic Obstructive Pulmonary Diseases
 - 2.5. Diabetes
 - 2.6. Mental and Neurological Disorders
 3. Economic and Social Implications of the Emerging Epidemics of Noncommunicable Diseases
 4. General Principles and Main Components of the Control of Noncommunicable Diseases
- Glossary
Bibliography
Biographical Sketch

Summary

Chronic noncommunicable diseases are rapidly increasing in importance as a global public health problem. An emerging epidemic of noncommunicable diseases is closely related to lengthening life expectancy in developed and many developing countries, profound and frequently unhealthy changes in lifestyles, and adverse physical and social environments.

By the end of the twentieth century, noncommunicable diseases were estimated to have contributed more than 60% of deaths in the world and almost half of the global burden of disease. The problem is universal and low- and middle-income countries suffer the severe and growing impact of noncommunicable diseases, which creates tremendous difficulties for public health services in areas where human and technical resources are extremely limited.

Chronic noncommunicable diseases now pose the greatest threat to health in both industrialized and developing countries. Health or epidemiological transition results in the changing pattern of health by which poor countries inherit the problems of the rich,

and leads to the “double burden” of disease in the developing world because of the continuing weight of endemic infectious diseases.

There is an important commonality to the risk factors for noncommunicable diseases and many of these risk factors are preventable. At the same time, most chronic noncommunicable diseases cannot be easily cured and almost every instance carries a burden of expensive and long-term treatment and, frequently, a supportive social environment of care. Therefore, a realistic response is demanded for the feasible and effective control of noncommunicable diseases. Emphasis must be placed on preventing the premature onset of noncommunicable diseases, delaying their development in later life, reducing the suffering they cause, and providing social and medical rehabilitation for those they disable.

Addressing the major risk factors should be given the highest priority. Risk factors related to lifestyle, such as tobacco smoking, heavy alcohol consumption, inappropriate diet, and inadequate physical activity, are to some extent within the control of well-informed individuals. Therefore, health education as an essential component of any comprehensive program for the control of noncommunicable diseases cannot be overestimated. However, the individual has little control over numerous other risk factors, such as the effects of poverty, poor reproductive and maternal health, genetic predisposition, occupational hazards, unhealthy living, and stressful conditions.

It is clear that an integrated approach to the prevention and clinical management of noncommunicable diseases should be provided at individual, community, and national levels. Until recently, most interventions have been medical, conducted through traditional disease-specific vertical programs. Integrated packages of disease-specific interventions must now be developed that incorporate primary and secondary prevention, timely detection, diagnosis, treatment, and rehabilitation for the most prevalent chronic noncommunicable diseases. This demands a new relationship in which specialists, experts, and policy makers in various fields look beyond their own professional boundaries and requires broad partnership of different social sectors.

1. Introduction

Control, in the broadest sense, of noncommunicable diseases (NCD), amongst them diseases of the cardiovascular system, cancer, diabetes mellitus, mental disorders, and many other determinants of chronic ill health, has become an integral and important part of health services in many countries.

Control of NCD consists of a series of measures based on present knowledge of prevention, detection, diagnosis, treatment, after-care, and rehabilitation aimed at reducing significantly the number of new cases, increasing the number of cures, and reducing the invalidism and premature death due to NCD.

For the purpose of this article, an NCD could be defined as a set of chronic diseases of major public health importance such as cardiovascular diseases (CVD), cancer, diabetes mellitus, lung diseases such as asthma and chronic obstructive pulmonary disease, chronic lesions of bone and joints, mental disorders and many others, the development

of which is influenced by one or more common risk factors of an endogenous or environmental nature including frequent involvement of genetic components and which are not known to be caused by infectious agents. However, recent discoveries have demonstrated that the latter play a much greater role in the origin of certain diseases than was previously thought and the borderline between infectious diseases and NCD is in many instances no longer distinct.

The magnitude and significance of the control of NCD are obvious from the observation that at least four of the ten most common causes of death worldwide during the 1990s were ischaemic heart disease, cerebrovascular disease, chronic obstructive pulmonary disease, and cancer. Since 1950, most countries worldwide have experienced increased life expectancy at birth and have entered the phase of epidemiological transition from a disease pattern dominated by infectious diseases to one characterized by NCD such as cardiovascular conditions, cancer, injuries, and diabetes.

For countries in epidemiological transition, most of which belong to the developing world, it would not be feasible to replicate the process that many industrialized countries have undergone in an attempt to control NCD: building curative health care infrastructure first and adding parallel services aimed at prevention at a later stage. An integrated approach that relies on preventive measures, curative interventions, and social care is needed to solve problems of effective control of NCD that could offer effective services at an acceptable cost. Leading representatives of the medical profession, international and national nongovernmental organizations (NGOs) dealing with problems of disease control, and the World Health Organization (WHO) have often warned about the rise in NCD and their causes, the unpreparedness of most governments and communities, and the insufficiency of health policy actions undertaken so far.

There is unequivocal evidence that much of the burden for which NCD are responsible can be reduced. Therefore, the need for an integrated approach to their prevention and control is no longer challenged. Since 1950, many observational studies, controlled trials, and intervention projects have shown the causal association of certain risk factors with NCD as well as the effects of preventive programs. Support from community health programs is an essential component of an integrated approach to the control of NCD. Health promotion and the reduction of major risk factors for chronic diseases by broader public health actions and by integrating preventive measures within functions of health services could be the basis for the development of the long-term plan for control of NCD.

Within the NCD control agenda there are some major issues, such as the role of government and the private sector, inequalities in access to health services, health research, and sustainable development, that require special consideration due to the characteristics of NCD that are closely related to economic, social, cultural, political, and environmental dimensions of human communities.

2. Chronic Noncommunicable Diseases and World Health

2.1. Epidemiological (Health) Transition

NCD present a major global health burden and their rapid continuing rise has created one of the major health challenges to sustainable global development for the twenty-first century. WHO's 1997 *World Health Report* indicated that NCD were responsible for nearly half of total global deaths. They caused about three-quarters of all deaths in industrialized countries and approximately 40% of all deaths in developing countries. The 1999 *World Health Report* reveals that in 1998 alone NCD were estimated to have contributed to almost 60% (31.7 million) of deaths in the world and 43% of the global burden of disease. Based on current trends, by the year 2020 these diseases are expected to account for 73% of deaths and 60% of the disease burden.

In the industrialized world, most infectious diseases are well under control. NCD now pose the greatest threat to health in developed countries. These are essentially the diseases that strike later in life and that, as life expectancy increases, will become more prevalent. However, as life expectancy in developing countries also increases, so does the certainty that people will become increasingly prone to diseases that are more common among older age groups. Life expectancy values in most developing countries have already reached the level observed in industrialized countries in the early twentieth century. If most individuals in the developing world do manage to survive the infections of infancy, childhood, and maturity, they will become exposed in later life to chronic NCD. This phenomenon is called the "epidemiological transition" or "health transition," meaning the changes that occur as countries move from a disease pattern dominated by infectious diseases to one characterized by NCD such as cancers, circulatory diseases, injury, mental disorders, chronic respiratory conditions, and musculo-skeletal diseases.

The epidemiological transition demonstrates the changing pattern of health in which poor countries inherit the problems of the rich, including not merely illness but also the harmful effects of unhealthy lifestyles such as tobacco and alcohol consumption, drug use, dramatically increased risk of traffic accidents, negative consequences of hyperurbanization, etc. This situation is also frequently referred to as the "double burden of diseases" because of the continuing weight of endemic infectious conditions in many developing countries.

A significant portion of the heavy global burden of NCD arises now from the low- and middle-income countries. For example, in 1998, of the total number of deaths attributable to NCD, 77% occurred in developing countries, and of the disease burden they represented, 85% was observed in low- and middle-income countries. In these parts of the world that are experiencing a double burden of diseases, NCD are already responsible for more than half of total mortality and 40% of total disease burden.

The increasing contribution of NCD to the burden of diseases in developing countries should not be explained away solely by the fact that their populations are getting older. Certain NCD manifest themselves at a relatively early age in populations of developing countries. For instance, almost half of the deaths attributable to cardiovascular disorders in developing countries in 1990 were people under 70 years of age, while in industrialized countries fewer than 23% of such deaths were observed in the same age group.

The incidence of NCD is expected to increase very significantly during the first half of the twenty-first century and the increase is likely to be particularly rapid in developing countries. The anticipated rise in the number of deaths due to CVD, diabetes, cancers, and chronic respiratory conditions will dramatically increase the burden imposed by NCD on countries, especially in the developing regions of the world.

Altogether chronic NCD are responsible for almost 32 million deaths a year, or more than half of the global total. The leading killers are circulatory diseases, including coronary heart disease and stroke, malignant tumors or cancer, and chronic obstructive pulmonary diseases. Diabetes mellitus, mental and neurological disorders should be added to this group because they also represent the most daunting challenges posed by chronic diseases.

-
-
-

TO ACCESS ALL THE 18 PAGES OF THIS CHAPTER,
Visit: <http://www.eolss.net/Eolss-sampleAllChapter.aspx>

Bibliography

Chemoprevention Working Group (1999). Prevention of cancer in the next millennium: Report of the Chemoprevention Working Group to the American Association for Cancer Research. *Cancer Research* **59**, 4743–4758. [Report realistically summarizes present situation, existing limitations, progress, projections, and problems related to chemoprevention of cancer.]

Dilman V.M. (1994). *Development, Aging and Disease. A New Rationale for an Intervention Strategy*, 387 pp. Langhorne, PA: Harwood Academic Publishers. [An excellent well-referenced monograph that outlines the fundamentals of an integrated approach to the control of NCD with regard to the common mechanisms of their pathogenesis.]

Gwatkin D.R. and Guillot M. (2000). *The Burden of Disease Among the Global Poor: Current Situation, Future Trends, and Implications for Strategy*, 44 pp. Washington, D.C.: World Bank, HDN-HNP. [This work illustrates differences in prevalence of communicable and NCD among rich and poor and speculations on the relative importance of possible impact of the control of NCD on the disease burden for low- and high-income population groups.]

Khaltaev N. and Tsechkovski M.S. (1998). INTERHEALTH programme policy and strategy development for noncommunicable diseases prevention and control. *Interhealth Newsletter*, NPHI, 3, 4–5. [The paper outlines objectives, scope, structure and main results of activities undertaken within the framework of the INTERHEALTH demonstration project. Unequivocal evidence is presented that much of the burden of NCD can be reduced by integrated preventive measures.]

Kuulasmaa K. et al. (2000). Estimation of contribution of changes in classic risk factors to trends in coronary-event rates across the WHO MONICA Project populations. *Lancet* **355**(9205), 675–687. [The authors assess the extent to which changes in risk factors could be responsible for variation in trends in coronary-event rates in 38 populations from 21 countries. The results support prevention policies based on risk factor control and suggested additional preventive potentials.]

Lichtenstein P. et al. (2000). Environmental and heritable factors in the causation of cancer. Analysis of cohorts of twins from Sweden, Denmark and Finland. *New England Journal of Medicine* **343**(2), 78–85.

[This article shows the complex interrelationship between these two groups of factors in the development of malignant diseases and indicates the related difficulties in controlling them.]

Murray C.J. and Lopez A.D. (1996). *The Global Burden of Disease: A Comprehensive Assessment of Mortality and Disability from Diseases, Injuries, and Risk Factors in 1990 and Projected to 2020*. Cambridge, Mass.: Harvard University Press. [Unique in its universal approach, a global epidemiological analysis of the present and projected prevalence of different groups of diseases including NCD. An attempt is made to rank the relative importance of their burden for society.]

Napalkov N. (1995). The role of WHO in promoting patient education with emphasis on chronic diseases. *Patient Education and Counseling* **26**, 5–7. [This paper emphasizes the importance of health and psychological education for sufferers from NCD in being able to cope with the disease and contribute to the community-based system of disease control.]

Puska P. (1998). Prevention of noncommunicable diseases: 25-year experiences of the North Karelia Project in Finland—from demonstration to national action. *Interhealth Newsletter* **3**, 6–7. [A concise analysis of main results of a unique project on public health promotion. The results demonstrate the effectiveness of a preventive approach to the control of NCD by implementing a community-based integrated program.]

Puska P. et al. (1995). *The North Karelia Project. 20-year Results and Experiences*. Helsinki: Helsinki University Printing House. [This paper provides essential information on one of the most successful community-based attempts to control NCD.]

Tunstall-Pedoe H. et al. (2000). Estimation of contribution of changes in coronary care to improving survival, event rates, and coronary heart disease mortality across the WHO MONICA Project populations. *Lancet* **355**(9205), 688–700. [An important attempt to reveal correlations between effect of changes in coronary care and secondary prevention and monitoring of coronary heart disease in populations.]

WHO (1963). *Cancer Control* (Technical Report Series, No. 251), 27 pp. Geneva: WHO. [A seminal and still valuable document produced by the WHO Expert Committee that provides information on an early internationally adopted approach to the control of one of the most serious NCD.]

WHO (1995). *National Cancer Control Programme: Policies and Managerial Guidelines*. Geneva: WHO. [Internationally recognized manual and collection of practical recommendations for public health services and national health policy makers on general principles and ways of implementing cancer control programs with special attention to the needs of developing countries.]

WHO (1997). *World Health Report 1997: Conquering Suffering, Enriching Humanity*. Geneva: WHO. [This report provides extensive information about epidemiological (health) transition, prevalence of different chronic NCD in developing and developed countries, and emphasizes the importance of health expectancy in relation to the global increase in human longevity. Special attention is paid to the control of chronic conditions and NCD.]

WHO (1999). *Global Strategy for the Prevention and Control of Noncommunicable Diseases* (Report of the Director-General. EB105/42, 16.12.1999). Geneva: WHO. [This report outlines a strategy proposed by WHO for the global control of NCD.]

WHO (1999). *World Health Report 1999: Making a Difference*. Geneva: WHO. [This report provides useful data on the phenomenon of the double burden of disease, outlines possible ways to combat the rising toll of NCD, their emerging epidemics, and probable approaches to the challenges of epidemiological transition.]

Biographical Sketch

Nikolai P. Napalkov, M.D., Ph.D., is director emeritus of the N.N. Petrov Institute of Oncological Research in St. Petersburg (Russia). He earned his Ph.D. in oncology at the All-Union Oncological Research Center of the USSR Academy of Medical Sciences in Moscow. Later he was awarded a professorship in oncology at St. Petersburg (then Leningrad) and specialized in cancer pathology, cancer epidemiology, and laboratory research. From 1971 to 1974 he served with WHO as chief of Cancer Unit and then for 15 years was director of the N.N. Petrov Institute of Oncological Research in St. Petersburg. From 1989 to 1998, Professor Napalkov was assistant director general of WHO in Geneva, and his area of responsibility included programs on environmental health, health education, protection and promotion,

mental health, and noncommunicable diseases. Since his retirement from WHO, he has continued his research work in cancer control and maintains close contacts with different international governmental and nongovernmental organizations dealing with problems of preventive medicine, environmental health, and health research.

UNESCO – EOLSS
SAMPLE CHAPTERS