
Management of Non-communicable Diseases - Prevention Vs. Intervention

D. S. Martolia¹, Tanu Midha²

¹Professor and Head, ²Associate Professor, Department of Community Medicine, Government Medical College, Kannauj, Uttar Pradesh, India.

Correspondence: Dr. D. S. Martolia, E mail: dr.martolia10@gmail.com

"Medicine is not health care; medicine is sick care. Good food, vigorous exercise, great friends, sound sleep and mental stimulation - that's health care." Community medicine or preventive and social medicine, being a sidelined branch in India, is actually the backbone of health care. Around 90% of all morbidity in the world can be dealt with using basic preventive approach to disease. Only 10% morbidity warrants specialized care or emergency health care. But unfortunately, the governments believe in trying to increase expenditure on health care in terms of specialized care rather than emphasizing on preventive measures to preserve health. In fact, preventive medicine is the most cost-effective strategy to improve the health status of the country.

Noncommunicable diseases (NCDs), like diabetes, heart disease, and cancer, account for around 70% of all deaths globally.^[1] Almost three fourths of all NCD deaths and 82% of the 16 million people who suffered premature death or died before the age of 70 years, occur in low- and middle-income countries.^[2] The increasing magnitude of NCDs has been primarily because of four major risk factors: tobacco use, physical inactivity, the harmful use of alcohol and unhealthy diets.

The epidemic of NCDs imposes dire health consequences on individuals, families and communities and threatens to overburden health systems. The socioeconomic costs associated with treatment of NCDs make the prevention and control of these diseases, a major development imperative for the 21st century. Urgent government action is needed to meet global targets to reduce the burden of NCDs especially by surveillance, prevention and control of NCDs.

Prevention of NCDs involves a wide range of activities specially tailored to the reduction of risk factors:

1. Tobacco control

The tobacco control is concerned with three core areas: tobacco control economics, national capacity building and surveillance and information systems for tobacco control. The "tobacco control economics" team aim to demonstrate that tobacco control policies, in particular tobacco taxation, make good economic sense. They work with countries to strengthen their tobacco tax systems, carry out research and develop tools and manuals to support research and policy development, and survey tobacco taxation in countries. The national capacity building team provides assistance to countries to enhance their ability to resist the epidemic of tobacco and to reduce the demand for tobacco, in line with the WHO Framework Convention on Tobacco Control (WHO FCTC). The comprehensive information systems team seeks to improve the availability of surveillance data on tobacco use, exposure and related health outcomes.

2. Health Promotion

The Health Promotion team promotes action across sectors for health and health equity, the reduction of health risks and the promotion of healthy lifestyles. Oral Health and School Health are two key work programmes of the team. The former aims to integrate oral health into NCD prevention and control and the later to intensify action for achieving NCD related health and education outcomes at the population level, in collaboration with key stakeholders within and beyond WHO.

3. Surveillance and Population-based Prevention

Surveillance and population-based prevention are fundamental to the mission to prevent deaths from NCDs. Population-based prevention focuses on broad policy, program and environmental interventions targeted at the general population more than just the

high-risk individuals. The Global School-based Student Health Survey (GSHS) is a collaborative surveillance project designed to help countries measure and assess the behavioral risk factors and protective factors in 10 key areas among young people aged 13 to 17 years. The GSHS is a relatively low-cost school-based survey which uses a self-administered questionnaire to obtain data on young people's health behaviour and protective factors related to the leading causes of morbidity and mortality among children and adults worldwide. The key topics addressed by the survey are: Alcohol use, Dietary behaviors, Drug use, Hygiene, Mental health, Physical activity and Tobacco use.

Non-communicable diseases: Cost effectiveness of Prevention vs. Intervention

Diabetes

Diabetes is a chronic, metabolic disease characterized by elevated levels of blood glucose (or blood sugar), which leads over time to serious damage to the heart, blood vessels, eyes, kidneys, and nerves. ^[3] The most common is type 2 diabetes, usually in adults, which occurs when the body becomes resistant to insulin or doesn't make enough insulin. In the past three decades the prevalence of type 2 diabetes has raised dramatically in countries of all income levels. Type 1 diabetes, once known as juvenile diabetes or insulin-dependent diabetes, is a chronic condition in which the pancreas produces little or no insulin by itself. For people living with diabetes, access to affordable treatment, including insulin, is critical to their survival.

The major long-term complications relate to damage to blood vessels. Diabetes doubles the risk of cardiovascular disease and about 75% of deaths in diabetics are due to coronary artery disease. Other "macrovascular" diseases are stroke and peripheral artery disease. The primary complications of diabetes due to damage in small blood vessels include damage to the eyes, kidneys and nerves. Damage to the eyes, known as diabetic retinopathy, is caused by damage to the blood vessels in the retina of the eye and can result in gradual vision loss and blindness.

Damage to the kidneys, known as diabetic nephropathy, can lead to tissue scarring, urinary protein loss and eventually chronic kidney disease, sometimes requiring dialysis or kidney transplantation. Damage to the nerves of the body, known as diabetic neuropathy, is the most common complication of diabetes. The symptoms can include numbness, tingling, pain, and altered pain sensation, which can lead to damage to the skin. Diabetes-related foot problems (such as diabetic foot ulcers) may occur, and can be difficult to treat, occasionally requiring amputation. Additionally, proximal diabetic neuropathy causes painful muscle atrophy and weakness.

The first WHO Global report on diabetes demonstrates that the number of adults living with diabetes has almost quadrupled since 1980 to 422 million adults. ^[4] Factors driving this dramatic rise, which is largely on account of type 2 diabetes, include overweight and obesity. The new report calls upon governments to ensure that people are able to make healthy choices and health systems are able to diagnose, treat and care for people with diabetes. Around 8% of women – or 205 million women – live with diabetes worldwide, over half in South-East Asia and the Western Pacific. During pregnancy high blood glucose substantially increases the risk to health for both mother and child as well as the risk of diabetes for the child in the future. Almost half of women who die in low-income countries due to high blood glucose die prematurely, before the age of 70 years. According to WHO, around 422 Million adults had diabetes in 2016. Around 1.6 million deaths are directly attributed to diabetes each year. About 1 in 3 adults aged over 18 years is overweight and 1 in 10 is obese.

Prevention:

Prevention of type 2 diabetes, which accounts for 85–90% of all cases, involves measures to minimize complications and maximize quality of life for all people with diabetes. Our core functions are to set norms and standards, promote surveillance, encourage prevention, raise awareness and strengthen prevention and control.

Main recommendations for individuals are :

- Cessation of tobacco consumption and smoking
- Increase consumption of fruit and vegetables, as well as legumes, whole grains and nuts;
- Limit energy intake from total fats and shift fat consumption away from saturated fats to unsaturated fats;
- Limit the intake of sugars;
- Be physically active - accumulate at least 60 minutes of regular, moderate to vigorous intensity activity each day that is developmentally appropriate.

Societal recommendations :

- Curbing the childhood obesity epidemic requires sustained political commitment and the collaboration of many public and private stakeholders.
- Governments, International Partners, Civil Society, NGO's and the Private Sector have vital roles to play in shaping healthy environments and making healthier diet options for children and adolescents affordable and easily accessible. It is therefore WHO's objective to mobilize these partners and engage them in implementing the Global Strategy on Diet, Physical Activity and Health.

Intervention:

- Lifelong prescription of oral hypoglycemic drugs, some of the newer ones like sitagliptin cost as much as Rs.50 per tablet;
- Insulin(eg.Actrapid) injections which cost Rs.2880 for 5 injections
- A pancreas transplant is occasionally considered for people with type 1 diabetes who have severe complications of their disease, including end stage kidney disease requiring kidney transplantation.
- Complication of type 2 diabetes - nephropathy may require kidney transplant, the costs of which are as follows:

Countries Average price

U.S.A	\$65,000
U.K.	\$76,500
India	\$19,000 (Rs.12,00,000 approx.)

Cardiovascular diseases

Cardiovascular diseases (CVDs) are disorders of the heart and blood vessels and include coronary heart disease, cerebrovascular diseases, rheumatic heart disease and other conditions. Four out of five CVD deaths are due to heart attacks and strokes. Cardiovascular diseases (CVDs) take the lives of 17.7 million people every year, 31% of all global deaths.^[5] Triggering these diseases are tobacco smoking, unhealthy diet, physical inactivity and the harmful use of alcohol. These in turn show up in people as raised blood pressure, elevated blood glucose and overweight and obesity. Around 17.7 million people die each year from CVDs, an estimated 31% of all deaths worldwide. More than 75% of CVD deaths occur in low-income and middle-income countries. Around 80% of all CVD deaths are due to heart attacks and strokes.

Prevention measures include the following :

- Tobacco use, unhealthy diet and physical inactivity increase the risk of heart attacks and strokes.
- Engaging in physical activity for at least 30 minutes every day of the week will help to prevent heart attacks and strokes.
- Eating at least five servings of fruit and vegetables a day and limiting your salt intake to less than one teaspoon a day, also helps to prevent heart attacks and strokes.

Intervention measures include :

- Angioplasty which costs somewhere between Rs. 1.2 Lakhs to 1.6 Lakhs (USD \$1850 to 2600). This will include one stent cost, surgeon fees, 2 to 3 day stay at the hospital, food for the patient, drugs and other consumables. If more than one stent is required, then the cost will be additional.

- Heart bypass which costs more than Rs. 1 lakh plus cost of hospital stay.

Cancer

Around 8.8 million people worldwide died from cancer in 2015. That is nearly 1 in 6 of all global deaths. US\$1.16 trillion was the estimated total annual economic cost of cancer in 2010. Around 30-50% of cancers could be prevented.^[6]

Cancer is a generic term for a large group of diseases characterized by the growth of abnormal cells beyond their usual boundaries that can then invade adjoining parts of the body and/or spread to other organs. Other common terms used are malignant tumors and neoplasm. Cancer can affect almost any part of the body and has many anatomic and molecular subtypes that each requires specific management strategies. Cancer is the second leading cause of death globally and accounted for 8.8 million deaths in 2015. Lung, prostate, colorectal, stomach and liver cancer are the most common types of cancer in men, while breast, colorectal, lung, cervix and stomach cancer are the most common among women.

Prevention :

According to current evidence, between 30% and 50% of cancer deaths could be prevented by modifying or avoiding key risk factors, including avoiding tobacco products, reducing alcohol consumption, maintaining a healthy body weight, exercising regularly and addressing infection-related risk factors. National policies and programmes should be implemented to raise awareness, to reduce exposure to cancer risk factors and to ensure that people are provided with the information and support they need to adopt healthy lifestyles.

Worldwide, tobacco use is the single greatest avoidable risk factor for cancer mortality and kills approximately 6 million people each year, from cancer and other diseases. Tobacco smoke has more than 7000 chemicals, at least 250 are known to be harmful and more than 50 are known to cause cancer.

Tobacco smoking causes many types of cancer, including cancers of the lung, oesophagus, larynx (voice box), mouth, throat, kidney, bladder, pancreas, stomach and cervix. Second-hand smoke, also known as environmental tobacco smoke, has been proven to cause lung cancer in non-smoking adults. Smokeless tobacco (also called oral tobacco, chewing tobacco or snuff) causes oral, oesophageal and pancreatic cancer. Nearly 80% of the 1 billion smokers in the world live in low- and middle-income countries.

- Prevention of Tobacco smoking: which causes cancers of the lung, oesophagus, larynx (voice box), mouth, throat, kidney, bladder, pancreas, stomach and cervix;
- Prevention of Second-hand smoke (also known as environmental tobacco smoke): which causes lung cancer in non-smoking adults; and
- Prevention of Smokeless tobacco (also called oral tobacco, chewing tobacco or snuff): causes oral, oesophageal and pancreatic cancer.
- Dietary modification is another important approach to cancer control. There is a link between overweight and obesity to many types of cancer such as oesophagus, colorectum, breast, endometrium and kidney. Diets high in fruits and vegetables may have an independent protective effect against many cancers. Regular physical activity and the maintenance of a healthy body weight, along with a healthy diet, considerably reduce cancer risk. In addition, healthy eating habits that prevent the development of diet-associated cancers will also lower the risk of other noncommunicable diseases.

Intervention :

- The average cost of treatment for breast cancer through a private practitioner would be Rs 5-6 lakh, including investigations, surgery and radiotherapy. However, with targeted therapy, six cycles of chemotherapy can cost up to Rs 20 lakh

In conclusion, as the age old saying goes "Prevention is better than cure". If we can only reinforce healthy behaviors, we can prevent a great

deal of morbidity and mortality due to non-communicable diseases and also save millions that are being spent on the treatment of the diseases and their complications.

References :

1. Global Health Observatory Data [Internet]. World Health Organization. 2018 [cited 06 January 2018]. Available from: <http://www.who.int/gho/ncd/en/>
2. Global status report on noncommunicable diseases 2014 [Internet]. World Health Organization. 2018 [cited 6 January 2018]. Available from: <http://www.who.int/nmh/publications/ncd-status-report-2014/en/>
3. Diabetes programme [Internet]. World Health Organization. 2018 [cited 06 January 2018]. Available from: <http://www.who.int/diabetes/en/>
4. Global Report on Diabetes [Internet]. World Health Organization; 2016. Available from: http://apps.who.int/iris/bitstream/10665/204871/1/9789241565257_eng.pdf
5. Cardiovascular diseases (CVDs) [Internet]. World Health Organization. 2018 [cited 06 January 2018]. Available from: http://www.who.int/cardiovascular_diseases/en/
6. WHO Cancer Control Programme [Internet]. World Health Organization. 2018 [cited 6 January 2018]. Available from: <http://www.who.int/cancer/en/>