

Presidential Address***Prevention of non-communicable disease - challenges in the next century****Ravindra Fernando***Journal of the Ceylon College of Physicians, 1999, 32, 9-18*

In the Presidential address of the Ceylon College of Physicians, I wish to discuss a major challenge Sri Lanka will be facing in the socio-economic and health spheres in the next century - "Non-communicable diseases".

Health is considered as a state of complete physical, mental and social well-being, and not merely the absence of disease or infirmity. Though this 1948 definition of the World Health Organization of Health is criticised because of the difficulty of accurately defining and measuring "well-being", it is worth attempting to achieve this ideal.

In 1977, the World Health Assembly resolved that the main target of all countries should be to attain a level of health permitting their citizens to lead socially and economically productive lives by the year 2000. It is quite clear that Sri Lanka will not attain that goal.

Sri Lanka has successfully reduced the incidence or eradicated many communicable diseases such as poliomyelitis, diphtheria, tetanus and smallpox in the last few decades.

Many developing countries including Sri Lanka observed a decline in death rates principally due to a decrease in deaths from infectious diseases and general improvement in standards of living, especially in nutrition and sanitation. For example, our death rate has fallen from 22 per 1000 population in 1945 to 5.8 in 1995¹.

Diseases like typhoid, paratyphoid, tetanus, shigellosis, viral hepatitis, malaria, pneumonia and meningitis were responsible for only 1348 deaths in our hospitals in 1996, while cancers alone killed 2087.

Income growth, improvements in medical technology, public health programmes combined with the spread of knowledge about health, were the four factors that caused a dramatic and unprecedented decline of mortality in developing countries like Sri Lanka this century.

Increased income allows people to buy more food, have better housing and access to health care. Therefore, reducing poverty is an indirect investment in health. The devastating effects of ill health are greatest for the poor because they are ill more often, their income depends on physical labour and they have no savings or insurance to protect them. Therefore, they may find it impossible to recover from an illness with their human and financial capital intact.

The second factor that leads to a decline of mortality was the improvements of medical technology. Introduction of antibacterial drugs, vaccines, and improved diagnostic services since about 1930s immensely contributed to reduced mortality as well as morbidity in the century².

Clean water, sanitation, food regulations and other public health measures were the third factor that helped to reduce mortality. The dissemination of health messages, the fourth factor, played a key role here as well.

Health education can play a major role in the next century to spread health messages on prevention of non-communicable diseases.

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Health education should start in schools, as many personal habits and life-style choices are formed early in life. Health education in schools therefore can help young people make informed choices³.

Health education in Sri Lanka is carried out mainly by institutions like the Health Education Bureau of the Ministry of Health, members of professional bodies such as the Sri Lanka Medical Association and the Ceylon College of Physicians, and University academics.

Although it is not possible always to assess quantitatively the success of health education activities, wide acceptance of immunization in children and western medical treatment for snake bites are just two success stories.

The continuous changing patterns of mortality and morbidity over time indicate that the major causes of disease are preventable.

There are four levels of prevention corresponding to different phases in the development of a disease. They are primordial, primary, secondary and tertiary⁴.

Although primordial and primary prevention has the most to contribute to health, all are important and complementary.

Conditions leading to causation of a disease in a population or a selected group are considered in primordial prevention. The aim is to avoid the emergence and establishment of the social, economic and cultural patterns of living that are known to contribute to an elevated risk of disease.

For example, avoidance of a diet high in saturated animal fat by a population will reduce the incidence of coronary heart disease. Comprehensive policies to discourage smoking, and programmes for the prevention of hypertension and to promote regular physical activity are also methods of primordial prevention.

Primary prevention aims to limit the incidence

of disease by controlling causes and risk factors. Examples of primary prevention activities included lowering cholesterol levels, reducing urban air pollution, use of condoms in the prevention of HIV infection, stopping smoking and wearing seat belts.

The aim of secondary prevention is to cure patients and reduce serious consequences by early diagnosis and treatment. Examples of secondary prevention in the area of non-communicable diseases are blood pressure measurements and treatment of hypertension in the middle-aged and elderly, and screening for cancer of the cervix or diabetes mellitus.

Tertiary prevention is aimed at reducing progress of or complications of established disease. Physicians have a major role to play here because it consists of measures intended to reduce impairments and disabilities, minimize suffering caused by departures from good health and promote patients' adjustments to incurable conditions such as strokes, blindness and disabling head and spinal injuries.

Health expectancy is more important than life expectancy. As people live longer, the risk of non-communicable disease grows⁵. Some of the hazards of living longer are as follows:

- Of more than 15 million deaths from circulatory diseases in 1996, 7.2 million were caused by coronary heart disease, 4.6 million by stroke, 500 000 by rheumatic fever and rheumatic heart disease, and 3 million by other forms of heart disease.
- An estimated 691 million people have high blood pressure.
- There are some 6 million deaths from cancer each year, half of them are due to cancers of the lung, stomach, colon-rectum, liver and breast.
- New cancer cases in developing countries are expected to at least double in the next 25 years.

- Tobacco causes 3 million deaths a year. Smoking accounts for one in seven cancer deaths.
- The number of people with diabetes mellitus is expected to more than double from 135 million now to 300 million by 2025.

Later death is of course a benefit, but it is essential to reduce the suffering and disability that longer life often brings. It is said that "Increased longevity without quality of life is an empty prize".

In 1996, Sri Lanka spent Rs.11,421.6 million on the health sector. Of this, 77% was on maintenance of health activities while the balance was on new investments⁶.

The Central Bank, recognizing that non-communicable diseases such as heart diseases and cerebrovascular diseases have emerged as the leading causes of death in recent years, commented on the necessity to allocate more resources on preventive health care⁶.

However, only 17% of the total health budget was spent on community health services that should play a major role in preventive health⁷.

Considering the existing resource constraints, catering to the ever increasing demand for curative health facilities and meeting the increasing commitment on preventive health care will be the major challenge Sri Lanka is facing in the next century.

In-patient morbidity and mortality data are collected routinely from Government Hospitals, through a return based on the Basic Tabulation List of the International Classification of Diseases. The data for 1996 excluded the districts of Killinochchi and Mullaitivu.

Causes of deaths in 1996 showed that ischaemic or coronary heart disease was the leading cause amounting to 3109 or 10.6% total deaths (Table 1).

There were 2792 deaths from cerebrovascular diseases, 2505 deaths from diseases of gastrointestinal tract, 2502 deaths from poisoning, 2395 deaths from pulmonary circulation and other form of heart disease, and 2087 deaths from cancer⁸.

Most of these diseases and conditions and therefore most of the deaths in some groups were preventable.

Table 1

Leading causes of hospital deaths - 1996

1. Ischaemic heart disease	3 109
2. Cerebrovascular disease	2 792
3. Diseases of the gastrointestinal tract	2 505
4. Poisoning	2 502
5. Diseases of pulmonary circulation and other forms of heart disease	2 395
6. Malignant neoplasms	2 087

I wish to consider coronary heart disease first as it is the leading cause of death in our hospitals. At least here, Sri Lanka is comparable to industrialized, affluent countries.

There is definite evidence that coronary heart disease is preventable, because some of the risk factors can be controlled, avoided or treated. Although it is stated that the most important predictor of who gets coronary heart disease is who the individual's parents were, there is an important environmental component that interacts with genetic predisposition.

Some of the well known risk factors for coronary heart disease are high plasma cholesterol and low density lipoproteins, raised blood pressure, obesity, diabetes mellitus, intake of saturated fatty acids, smoking high alcohol consumption and stress.

Therefore, it is necessary to develop strategies to prevent the rising incidence of coronary heart disease in Sri Lanka. There are well recognized approaches identified by international studies we can modify and implement, considering the constraints we face.

The prevalence of diabetes mellitus in Sri Lanka is about 5% among the urban population aged 31 to 64. In rural areas it is about 2%. When we consider the frequency with which we detect new diabetics in our clinics, we sometimes wonder whether even these alarming figures are under-estimates.

The prevalence of diabetes mellitus is expected to increase and the next century will see our elderly population suffering from more and more heart attacks, strokes and poor vision as a direct result of diabetes.

Studies have clearly shown the unsatisfactory nature of management of diabetes mellitus in state hospitals⁹. For example, in the diabetic clinic in the National Hospital of Sri Lanka, a single medical officer spends just over 2 minutes for each patient, no screening was performed for retinopathy, urine not tested for nephropathy and no information was provided to educate the diabetics.

Establishment of diabetes health care teams consisting of a physician, nurse educator and a dietician at least at tertiary level hospitals like the National Hospital of Sri Lanka has been suggested. Such teams could provide comprehensive high standard diabetic care and educate the patients to prevent further complications.

The authorities will say this is a costly exercise without assessing all the savings such teams will make in preventing coronary by pass surgery, stroke management, kidney disease and eye surgery.

More than half the young children who die in developing countries are malnourished. This does not mean that they starve to death but that poor nutrition lowers their resistance to killer diseases. It is at the stage when the human body is developing that malnutrition has its most severe effects. Apart from the 6.6 million malnourished children

under five who die each year, 174 million more are underweight and 230 million have stunted growth.

Improvement of nutrition in adults and children is a major challenge that we face. With all the commendable achievements we can be proud of in the health sector, nutrition remains a grave health concern.

Four main types of malnutrition are the most damaging. They are protein energy malnutrition, iron deficiency, iodine deficiency and vitamin A deficiency.

For example, iodine deficiency is a public health problem in 118 countries. As a result at least 30,000 babies are stillborn each year and more than 120,000 are born mentally retarded, physically stunted, deaf-mute or paralysed.

I highlighted some of these nutritional deficiencies in a study of tea plantation women in the Nuwara Eliya district¹⁰. 12% of the 149 women examined in this study has goitres while one was clinically hypothyroid. I am pleased that the recommendation to provide iodized salt made by many physicians and me was implemented a few years ago.

Anaemia was detected in one third of these plantation women. Anaemia not only contributed to symptoms such as weakness and tiredness, it also reduced efficiency at work leading to reduced work output affecting their income. Much more alarming is that anaemia has contributed to high maternal deaths among women.

State of World's Children report of the UNICEF mentions that from 1990 to 1994, 25% of infants were born with a low birth weight in Sri Lanka¹¹. Figures for 1990 to 1997 show that 7% of under fives were severely underweight and 38% were moderately underweight. More alarming is the fact that 16% of them showed wasting and 24% showed stunting of growth indicating gross malnutrition. The so-called "trickle down" effect of the open economy or free market economy and reduction or abolition of subsidies for the sake of so-called 'economic growth' has clearly not benefited the poor.

It is disturbing to note that traumatic injuries were the leading cause of hospitalization amounting to 366,038 cases or 12.7% of all admissions¹². Although a detailed analysis of this figure is not available, the injuries must be due to road traffic accidents, occupational and home accidents, and ever increasing deliberate violence.

The decade 1986 to 1995 saw the deaths of 14,852 Sri Lankans on the roads. The largest group who died was pedestrians. According to police statistics, over 150,000 were injured, some seriously. As expected, peoplised and private buses were the vehicles mostly involved in these accidents.

Reckless and high speed driving, bad roads, badly maintained vehicles and alcohol all play a part in road traffic accidents.

The decade 1987 to 1996 had new registration of 15,404 buses, 185,188 cars, 489,362 motor cycles and nearly 100,000 other vehicles, a grand total of over 787,000 (Table 2)¹³.

The road network however did not increase to satisfy the demand of these new vehicles. Therefore, the congestion of roads is clearly another contributory factor for the increasing numbers of road traffic accidents.

Table 2

**New registration of motor vehicles
1987-1996**

Buses	15 404
Cars	185 188
Motor cycles	489 362
Goods transport vehicles	41 790
Land vehicles	51 128
Private coaches	4 176
Other	471
Total	787 519

When considering traumatic injuries, it is indeed unique that the first volume of the Transactions of the Ceylon College of Physicians carried a 20 page article on "The Role of Physicians in Road Safety", written by the then Chief Medical Officer, Ceylon Transport Board and member of the Permanent Commission, International Association Occupational Health¹⁴. He concluded his article by stating that "organized team work by people in many disciplines such as Educators, Engineers, Physicians, Psychologists and Enforcement Officers is necessary for effective prevention of road traffic accidents". It is indeed tragic that even after 3 decades nothing definitive has been done to reduce the morbidity and mortality from road traffic accidents in Sri Lanka.

Physicians alone cannot take meaningful steps to reduce the alarming increase of morbidity due to traumatic injuries.

The cost of road traffic accidents to the health sector is difficult to determine but it must be in region of a few hundred millions. When these victims are admitted to private hospitals they claim hospital expenses through their private health insurance schemes or the vehicle insurer. The state must devise a system of charging such patients who can claim the expenses when they are treated even in state hospitals. This will enable the state to recover cost of care of some patients admitted especially to the National Hospital of Sri Lanka and other tertiary hospitals.

Cancers caused 2087 deaths in our hospitals. As common cancers occur mainly as a result of the way people behave and their life styles and habits, they are preventable. Cancer is the end result of a multistage process. There are initiating and promoting agents of cancer. We know the so-called carcinogens such as blue asbestos which cause pleural cancer, tobacco smoking which cause lung cancer and 2-naphthyl-amine responsible for bladder cancer. Avoidance of these and early detection of cancer by screening methods can reduce the morbidity and mortality from cancer.

Violence in all its forms has increased dramatically in recent decades. It is estimated that world over around 300,000 people are murdered and 800,000 more kill themselves each year. During 1993, at least 4 million people died as the result of intentional and unintentional injury (8% of all deaths).

In Sri Lanka, the decade 1987 to 1996 had 25,277 homicides. This figure includes the unfortunate years of the political violence where 4173 homicides were recorded in 1988, and 8127 were recorded in 1989. If we consider the relatively peaceful last 5 years alone, the average homicide rate was 1487 per year.

Suicide is a deliberate act carried out by a person who expects it to result in death. Worldwide, suicide is most common among men.

Sri Lanka holds the most deserving and proud world record of one day cricket champions. Sadly, Sri Lanka also holds the world record for having the highest suicide rate in the world. We are told that the 14 year old North-East war took some 50,000 lives. Compared to this, 73,908 Sri Lankan men and women committed suicide in the last decade alone.

According to the Registrar General's mortality statistics of 1995, 4283 suicidal deaths were in the 15-49 year group.

The Presidential Task Force on Prevention of Suicides has prepared a "National Policy and Action Plan on Prevention of Suicides". Some of the recommendations of the Committee are to restrict the free availability of pesticides and other lethal substances, phase out lethal pesticides over a period of 10 years and promote biological methods, create awareness in the community about proper handling, storage and use of pesticides and upgrade treatment facilities for management of acute poisoning. The committee has identified the social and cultural factors that can contribute to suicide and recognizes that one group takes poison as a means of responding to a short lived or minor stress.

Violence against children can take the forms of physical abuse, sexual abuse, emotional abuse and neglect. These are worldwide problems and studies suggest that the rate of child abuse and neglect of children under five years could be between 13 and 20 per 100,000 live births. In Sri Lanka, I reported the first case of death from battered baby syndrome¹⁵. Since then, especially in the last few years, pioneering work of two members of this College, Prof. Harendra de Silva and Prof. Niriellege Chandrasiri has highlighted the problem of child abuse in this country.

Violence against women is also a significant problem in Sri Lanka and often goes unreported. In some countries, domestic violence is the leading cause of injury among women of childbearing age, and up to 35% of women's visits to emergency treatment centres are for that reason. We have no accurate statistics on domestic violence.

In 1996, 16,500 patients were admitted with liver disease causing 2155 deaths. This is nearly a three fold increase compared to figures a decade ago. Alcohol is mainly responsible for liver disease in Sri Lanka.

The government should carefully redetermine its policies towards alcohol and tobacco. It is true that thousands are employed in activities related to alcohol and tobacco. It is true that annual tax on alcohol and tobacco amounted to Rs.5839 million and 12,833 respectively. The health services alone may be spending hundreds of millions to treat alcohol and tobacco related illnesses such as cirrhosis of the liver, lung cancer and coronary heart disease. The other costs to the society from alcohol related crime and loss of productivity cannot be quantified easily. Alcohol also plays a major role in some suicides, violence against women and children, and road traffic accidents.

I mentioned earlier that a success story of health education in Sri Lanka in the acceptance of western medical treatment by our people. This fact is shown in the statistics of the Health Ministry. For example, in 1987 there were only 5665 hospital admissions from snake bites. In just a

decade this figure increased to 27,251 or nearly 500%. However, the number of hospital deaths remained around 150. In fact, the case fatality rate decreased from 2.4% to 0.6%.

It is believed that 2 to 3 Sri Lankans die from snake bite every day. This is yet another world record and I am told that last year's Guinness Book of Records mentioned Sri Lanka as having the highest death rate from snake bite in the world.

Table 3.

Hospital admission and deaths from snake bites 1987 - 1996

Year	Admissions	Deaths
1987	5 665	134
1988	6 750	163
1989	7 345	144
1990	7 734	114
1991	12 175	163
1992	17 064	182
1993	20 066	166
1994	20 705	159
1995	25 912	190
1996	27 251	164
Total	150 666	1 579

Incidence of poisoning, which was steadily increasing in the last few decades, reached a peak in 1996 as shown in Table 4. There were 70,923 admissions from poisoning, including snake bites resulting in 2502 deaths¹⁶. It has to be noted that no data were available from Mullaitivu and Killinochchi districts, while even in other districts, 22% of deaths and 12.8% of live discharges were not analysed.

Pesticides are the commonest chemical substances causing poisoning. This is not surprising when one considers the fact that agriculture is the most important sector in Sri Lanka's economy, employing over half the labour force. Pesticides accounted for 21,129 admissions and 1850 deaths in 1996. Pesticides poisoning was the leading cause of death in 4 districts, namely, Hambantota, Anuradhapura, Polonnaruwa and Moneragala.

To mention another world record, Sri Lanka has the highest death rate from pesticide poisoning in the world.

Dissemination of health messages can be done through print and electronic media or by seminars and workshops. The successful preventive health messages given through print and electronic media to the public during the recent cholera epidemic is an example.

In addition to these, specialized programmes on information dissemination are useful. In Sri Lanka the only such programme is the National Poisons Information Centre in the National Hospital of Sri Lanka.

Even in developed countries like the United States of America and the United Kingdom, health professionals usually have little knowledge of what toxic ingredients are contained in various pesticides and household chemicals. Although medical professionals are aware of clinical and adverse effects of drugs, their knowledge is limited regarding management when they are presented with an overdose.

To provide quick, accurate and tailor-made information on toxic ingredients of poisons, their chemical effects and complications, and management of patients presenting with poisoning, poison information centres or poison control centres were established in developed countries. In the United States for example, the major concern was poisoning in childhood. In 1953 the Director of the

Table 4

Hospital admission and deaths from poisoning 1996

	Total Hospital Admissions	Hospital Deaths	Case Fatality Rate
Organophosphates and carbamates	14 894	1 327	9.0%
Other pesticides	6 235	523	8.4%
Medicinal agents	8 977	145	1.6%
Snake bites	27 251	164	0.6%
Other poisoning and toxic effects	13 566	343	2.5%
Total	70 923	2 502	3.5%

Division of Services for Crippled Children at the University of Illinois and of the Illinois Chapter of the American Academy of Paediatrics was asked to form a subcommittee on poisoning. One objective of the Committee was to inform and work with physicians to educate parents in the methods used in the prevention of childhood poisoning.

In 1962, an official report of the Ministry of Health of the United Kingdom recommended that "An information service on poisoning should be set up with central arrangements for coordination"¹⁷. The task of implementing this was undertaken by Dr. Roy Goulding of the Department of Pharmacology, Guy's Hospital. With the cooperation of the Board of Governors of Guy's Hospital and active personal support of Professor Keith Simpson, Professor of Forensic Medicine, Dr. Goulding established the first poison information service in the United Kingdom¹⁸. This service, now known as the Medical Toxicology Unit is in the premises of the New Cross Hospital, London, and is one of the key centres in Europe.

In 1973, seven consultant physicians of the premier teaching hospital in Sri Lanka, the General Hospital, Colombo, suggested the establishment of a "Toxicology Advisory Bureau whose services should be made available to medical practitioners to render advice in cases of poisoning"¹⁹.

It took another thirteen years even to initiate the establishment of a Poisons Information Service in Sri Lanka. This was possible thanks to a generous three year project grant I obtained from the International Development Centre (IDRC), Canada, channelled through the Ministry of Teaching Hospitals in 1986. With the technical support of the Poisons Unit, London, the National Poisons Information Centre started functioning in January 1988²⁰. As usual, there were objections from my own colleagues for the Poisons Centre. The courageous stand of the Ministry, especially of the Ministry Secretary Dr. Daya Samarasinghe, ably supported by the then Minister Hon. Sunethra Ranasinghe, the Poison Centre was a reality. This has to be mentioned because my efforts to estab-

lish a drug information service a few years ago to provide all information of drugs such as indications, adverse effects, contraindications, dosages, safety during pregnancy and breast feeding, and cost to the patient were unsuccessful.

Information is of no value unless it is disseminated to fulfil the needs of the community or selected sections in the community who can utilise them. Major routes of dissemination of information are (a) through print media (b) through electronic media and (c) by having seminars, conferences and workshops.

The National Poisons Information Centre (NPIC) has received 4070 communications requesting information from 1988 - 1997. Out of this, 3671 were telephone enquiries. 368 were personal visits made to the centre by either medical officers or members of public, and 28 were written enquiries. There were three international enquiries by fax and e-mail.

The purpose of enquiry is shown in table 5.

Table 5

Purpose of enquiry

Purpose of enquiry	Number	%
Enquiries on management of Poisoned patients	3 742	91.94
Enquiries for information poisons	251	6.17
Enquiries on previous calls	62	1.52
Enquiries on poisoned animals	15	0.37
Total	4 070	100.00

Medical officers, other health care personnel and many other categories of individuals contacted the Centre for information.

The cost of poisoning to the health sector has not been properly assessed. One study has shown that on average Rs. 3875 is required to manage a patient with organophosphate poisoning²¹. Another study by the same group calculated that Rs. 1448 is required for a snake bite victim²². These are hospital costs for medicines, investigations and staff time only. Infrastructure costs, cost to the patient and the family by way of direct costs and indirect costs due to loss of productivity have not been included.

If one considers the calculated amounts mentioned above, in 1996 for patients with organophosphorous poisoning, state hospitals spent Rs. 57,714,250 and for snake bite victims Rs.39,459,448. Considering an average of Rs. 1500 for other poisoning cases, the total hospital expenditure was Rs. 112,202,476.

Accepting certain inherent deficiencies in these calculations based on a couple of studies performed in teaching hospitals, even a 5% reduction of this figure amounts to Rs. 56 million to manage poisoned patients. This amounts to 0.5% of all health expenditure for 1996!

To disseminate information, the National Poisons Information Centre has published several books and educational material. Some of them are a brochure on "First aid for Pesticide Poisoning", books titled "Management of Pesticide Poisoning", "Management of Acute Poisoning", and "Pesticides in Sri Lanka", a poster on "First aid for Poisoning", and a newsletter titled "Therapeutics and Toxicology".

It is high time that the state and all other concerned parties take effective action to reduce the rising morbidity and mortality from poisoning. The lone struggle of the underfunded, understaffed NPIC with an insignificant annual budget of less than a million will not be adequate.

It is necessary to formulate a comprehensive programme by health authorities to educate public on prevention of non-communicable diseases.

Healthy life styles, proper nutrition, prevention of accidents and poisoning, and avoidance of alcohol, tobacco and other substances of abuse should be the main themes of this ambitious programme.

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