

A Countrywide Approach to the Control of Non-communicable Diseases—The Singapore Experience

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Abstract

Introduction: Many developed and developing countries are grappling with recent epidemics of non-communicable diseases and how to effectively control them. Singapore as a small, compact and highly urbanised country has similarly experienced a rapid increase in its chronic disease load and has adopted a national approach to control them. **Methods:** This paper traces the strategies taken in the 80s and the 90s to control non-communicable diseases and evaluates the effectiveness of the two approaches. **Results:** In the 80s, the control programme was largely a Ministry of Health responsibility using a persuasive approach to reach out to the target groups. This produced some results through the lowering of hypertension and cholesterol. For the 90s, the approach was one of leadership by government working with relevant agencies to reach out to all relevant sectors in the population. This National Healthy Lifestyle Programme was given top political support. The integrated and comprehensive approach used showed some improvements in health and gave the direction where efforts should be channelled. **Conclusion:** The countrywide approach taken in Singapore for the control of non-communicable diseases illustrates a model where a national framework was adopted, harnessing health promotion and disease prevention and involving personal responsibility as a key success factor. This rides on a well-developed continuum of healthcare which aims to become an integrated and seamless one.

Ann Acad Med Singapore 2002; 31:474-8

Key words: Chronic diseases, Eighties and nineties decade, Government-led, National approach, Working with the community

Introduction

In the area of health, the last two decades has seen a decline or eradication of deadly diseases, such as smallpox and polio, the introduction of the fatal disease, such as acquired immunodeficiency syndrome (AIDS), and a marked rise in chronic diseases, making them the leading worldwide public health problem.^{1,2} This new epidemic is a result of the adoption of high-risk behaviours by populations in developed countries and in many developing and newly-industrialised economies.

Strong scientific evidence tells us that chronic diseases have their roots in unhealthy lifestyles and in adverse environments. Such lifestyles have been responsible for causing chronic diseases on a mass scale among some of the world's largest populations.^{3,4} Scientific evidence also shows that the causative factors for chronic diseases are preventable and amenable to early detection and management and although multifactorial, many of the causes are common and can be controlled using an integrated approach.³⁻⁵

Many developed countries have, over the past three decades, demonstrated impressive declines in their chronic disease load as a result of improvement in lifestyles of their populations and in their medical care.^{5,6} Such countries offer rich examples for study and adaptation to other socio-cultural settings. What has been clearly shown is that the role of the individual in accepting personal responsibility for his or her own health behaviour is a basic premise and should form the cornerstone in national control programmes. Furthermore, strong committed leadership is critical and major sectors besides healthcare must play an increasing leadership role if we are to be successful in improving the health of our population.

A Case Study—The Singapore Experience

Singapore is a small, cosmopolitan and “newly-industrialised” city-state with a total population of 4.13 million. The population comprises 3 main racial groups: Chinese (77%), Malays (14%) and Indians (8%).⁷ Between 1970 and 2001, the per capita GNP in Singapore registered

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TABLE I: CHRONIC DISEASE RISK FACTORS LEVELS IN ADULT SINGAPOREANS AGED 18 TO 69 YEARS, 1984^{11,17} VERSUS 1992¹²

	Male		Female		Total	
	1984	1992	1984	1992	1984	1992
Diabetes mellitus (%)	5.7	8.8	3.9	8.3	4.7	8.6
High blood pressure (%) ^a (≥160/90 mm Hg)	17.2	16.6	13.3	10.6	15.3	13.6
Total cholesterol (mmol/L)	5.7	5.3	5.9	5.3	5.8	5.3
HDL cholesterol (mmol/L)	0.9	1.1	1.0	1.4	0.9	1.3
Obesity (%) (BMI ≥30 kg/m ²)	3.9	4.1	6.6	6.0	5.2	5.0
Daily smoking (%) ^b	37.0	33.2	3.0	3.0	20.0	18.3

BMI: body mass index; HDL: high-density lipoprotein

^a Between the ages of 30 and 69 years; ^b Between the ages of 18 and 64 years

a 22-fold increase, from US\$923 to US\$20,892, enabling Singaporeans to achieve significant improvements in their socio-economic status and to enjoy the second highest standard of living in Asia, after Japan.^{8,9}

Improved standard of living, better education, good housing, a high level of public and environmental health services and the active promotion of preventive healthcare in Singapore all have greatly helped to boost the health of Singaporeans. The infant mortality rate today stands at 2.2 per 1000 livebirths and life expectancy at birth stands at 80 years for Singaporean females and 76 years for Singaporean males.⁷

The leading causes of death have also changed from those due mainly to infections to those due to the chronic degenerative diseases, with cardiovascular disease, cancer, diabetes and hypertension together accounting for two-thirds of deaths among Singaporeans today.¹⁰

With rising affluence, powerful social forces have been generated influencing many Singaporeans to adopt lifestyles deleterious to health. Lifestyles of physical inactivity, obesity, cigarette smoking, excessive alcohol intake, the consumption of rich and fatty foods and fast “modern-living” have all predisposed Singaporeans to rising levels of chronic diseases (Tables I & II).^{11–15} The ageing of the population—the proportion of elderly Singaporeans (65 years and above) rising from 2.1% in 1957 to 7.4% in 2001—has exacerbated this.¹⁰

Today, our coronary heart disease rates are much higher than those from neighbouring countries with similar cultural and social backgrounds, e.g. Malaysia, Thailand, Indonesia and Japan.⁹ What is tragic is that much of the morbidity and mortality occurring among Singaporeans has taken place at around the prime of their lives, resulting in high human, social and economic costs.¹⁶

Control Measures against Chronic Diseases in Singapore

This health situation in Singapore has prompted the Singapore Government to embark on an active and intensified

TABLE II: PREVALENCE OF DISEASES AND RISK FACTOR LEVELS IN SINGAPOREANS AGED 18 TO 69 YEARS, 1992¹² VERSUS 1998¹³

Disease/Risk factor	1992	1998
Diabetic mellitus	8.6%	9.0%
High blood pressure ^a (≥140/90 mm Hg)	22.2%	27.3%*
Daily smoking ^b	18.3%	15.0%*
Regular exercise (at least 3 times/week, 20 min per session)	13.6%	16.8%*
Obesity (≥30 kg/m ²)	5.1%	6.6%
Blood cholesterol		
- % of adults with high total cholesterol (≥6.2 mmol/L)	19.4%	25.4%*
- mean total cholesterol	5.3 mmol/L	5.5 mmol/L
- % of adults with high LDL-cholesterol (≥4.1 mmol/L)	22.9%	26.5%*
- % of adults with low HDL-cholesterol (<0.9 mmol/L)	6.0%	5.2%
Diet excessive in saturated fats	—	79.2%

HDL: high-density lipoprotein; LDL: low-density lipoprotein

^a Adults aged 18 to 64 years^b Adults aged 30 to 69 years

programme of health promotion and disease prevention, addressing problems such as socio-cultural differences in the population and countering the harmful effects of rapid urbanisation and the overpowering influence of the media in glamorising sophisticated lifestyles and “fast-living”, especially to the young. The Singapore Health Plan, covering the various lifestyle risk factors, was drawn up based on the experiences of developed countries that had successfully reduced their chronic disease rates. This approach, it was felt, would provide the maximum returns for long-term investments in health and offer Singaporeans an improved quality of life in the long term.

In the 1980s

The intensified Singapore Healthy Living Programme which began in the 1980s was, for the first decade, mainly the responsibility of the Ministry of Health. It included sustained health education programmes through media and print materials and direct patient counselling to counter the rising trend in lifestyle risk factors among Singaporeans. Regular large-scale campaigns, such as “Your Health In Your Hands,” were held to promote a smoke-free lifestyle, healthy eating habits and regular exercise. The early detection of diseases through the screening of high-risk groups was also implemented.

This Ministry of Health Programme, which used a persuasive approach to reach out to organisations and their target audiences, was backed by a few pieces of legislation. It resulted in a reduction in some of the risk factors to chronic diseases among the people (Table I). There was a decline in high blood pressure levels (from 15.3% in 1984 to 13.6% in 1992), a decline in total cholesterol levels (from 5.8 mmol/L to 5.3 mmol/L) and an improvement in HDL cholesterol levels (from 0.9 to 1.3 mmol/L) during the 8-year period, as a result of the national health promotion activities set in place in the 80s.

Evaluation of the Chronic Disease Programme

Results from these programmes were obtained from comprehensive evaluation systems set up to monitor risk factor levels and the chronic disease load in the country. These included the conduct of large national epidemiological surveys based on World Health Organisation’s (WHO) guidelines and those of leading research centres experienced in the effective surveillance of chronic diseases. Through such surveys, population levels of diabetes, hypertension and other lifestyle risk factors to chronic diseases, such as high blood cholesterol, physical inactivity, smoking, obesity and excessive alcohol consumption, are regularly monitored and evaluated.

A population-based Singapore Cancer Registry,¹⁸ which was established in 1967, provides detailed information on population levels of the various cancers. The Singapore Myocardial Infarct Registry was set up in 1988 according to the specifications of the WHO’s Multicentre MONICA Registries^{16,19} to monitor the trend in the incidence of heart attacks in the county, so as to evaluate the effectiveness of the many preventive and treatment programmes implemented over the years.

Furthermore, information on disease-load is available from large integrated computerised health databases covering primary and secondary level ambulatory care, hospitals admissions and deaths in Singapore.

Enhanced Chronic Disease Control Measures in the 1990s

At the start of the decade of the 1990s, to counter the

trend of rising healthcare costs and to further improve the health of Singaporeans, the Government appointed a team of national experts to review Singapore’s healthcare policies for the decade of the 90s. This Committee was named “The Review Committee on National Health Policies”.

The Committee’s first report, entitled “Healthy Family, Healthy Nation”, sets the direction for healthy living as the strategy that was to be the basic philosophy for Singapore’s healthcare policies and one that would provide maximum returns for investments in health. The Report promoted a multidisciplinary and multisectoral effort to instil healthy living on a national scale among Singaporeans, using an integrated approach to control chronic diseases, since these are the leading causes of morbidity and mortality and as they share similar risk factors. The report also set out, for the first time, specific targets and goals in the lifestyle risk factor levels among Singaporeans, to be achieved by the start of the 21st century.

Following this, renewed vigour and enthusiasm were injected into drawing up a comprehensive and multisectoral strategic plan, to integrate healthy-living into the daily lives and activities of Singaporeans. This plan was spearheaded by Government. A multisectoral National Healthy Lifestyle Committee was set up made up of 14 key organisations comprising relevant Ministries, Statutory Boards and private organisations to draw up strategies to prevent and control chronic diseases using an integrated approach. This Programme aimed to ensure that individuals are informed and motivated to assume responsibility to safeguard their health and have the supportive environment to facilitate and encourage healthy living during all phases of their lives.

The National Healthy Lifestyle Programme, a 10-year effort, was launched with a month-long National Health Campaign in April 1992 by the Prime Minister of Singapore as a reflection of the top-level political commitment and support for the Programme. This campaign was to be repeated each year, with a special theme every year, to serve as the focus for efforts on healthy living for that year. In 1993, the campaign was entitled “Family Fitness is Fun” and was launched, once again, by the Prime Minister of Singapore in October at a large national gathering of Singaporeans in a mass display of aerobic exercise, indicating unified public commitment to physical activity. Together, they performed the Great Singapore Workout—a specially choreographed aerobic exercise created for the occasion, which was suitable for all ages.

To implement the strategic plan on healthy living for Singapore, community interventions were drawn up to reach out to all target groups in the populations, namely the young, the school-going population, the workforce, uniformed groups, housewives and the elderly. Leadership, for all these efforts for healthy living, came from government,

working with schools, employers, unions, community, grassroots and voluntary organisations and non-governmental and professional organisations, using education, information and a supportive environment, backed up by legislation where necessary.

In the entire plan, special and major efforts are channelled to the young, to inculcate in them healthy living as the norm, at the time when their habits are being formed. Adults are strongly encouraged to provide the leadership in these efforts. As an important part of this strategy, programmes drawn up by the Ministry of Education and the Ministry of Health were implemented in schools offering healthier choices in school canteens to encourage good eating habits among school children and the installation of water coolers to encourage the drinking of water instead of sweetened drinks. In addition, a special Trim and Fit Programme was launched to improve physical fitness and to reduce obesity among school children.

The Government also spearheaded a workforce healthy living programme through a Public Sector Workplace Healthy Lifestyle Programme. This was to serve as a prototype for duplication at a later stage, if found successful. The Programme was modelled from an established company wellness programme from the USA, and comprised health profiling and health improvement programmes. The aim was to create awareness of lifestyles and diseases and one's health profile and to motivate everyone to learn the skills that will enable them to lead a healthy life.

In 1999, a Tripartite Committee on Workplace Health Promotion was formed with representatives from employers union and government to improve and expand workplace health programmes particularly in the private sector.

Much attention has been focused on the important area of nutrition and health. A Food and Nutrition Department was set up by the Ministry of Health in 1990 to promote healthy eating and to monitor the dietary patterns and habits of Singaporeans. The focus of the nutrition objectives in the country was expanded to encompass the deleterious role of over-consumption of fat, cholesterol, salt and sugar and other dietary factors associated with chronic diseases. "Guidelines for a Healthy Diet" were set out by the National Advisory Committee on Food and Nutrition, a high-level committee of experts appointed by Government, setting out targets for the consumption of total fat and its major components, cholesterol, complex carbohydrate, salt, alcohol and to promote breastfeeding in the Singapore population. Present efforts are channelled towards nutrition labelling of food packages and responsible advertising to help Singaporeans make informed choices in food selection.

Smoking Control Programme

Recognising the powerful adverse effects of smoking on

health, Singapore is fully committed to reducing smoking in the population. An intensified smoking control programme was implemented with the stated objective of making Singapore "A Nation of Non-Smokers". Strategies for the Singapore Programme were drawn from experiences in smoking control used elsewhere by countries that have taken up the challenge to protect their people from the ill effects of smoking.

Measures to discourage smoking in Singapore can be traced as far back as 1970 when legislation was first introduced to restrict smoking in selected public areas and to prohibit tobacco advertisement on television or print media.

In 1986, a National Smoking Control Programme was launched, with the overall objective of reducing the smoking rate and promoting non-smoking as the norm in Singapore. This Programme was the responsibility of a multisectoral National Smoking Control Committee made up of 51 members, representing government ministries and statutory bodies, non-government organisations and private organisations.

The National Programme was targeted at all smokers and was aimed at dispelling the glamour of smoking and highlighting its ill effects mainly through the channel of public education. The second objective was to protect the health of non-smokers by educating them on the ill effects of smoking and of their rights as non-smokers, and designating areas where smoking was prohibited. This included all government buildings, clinics, hospitals, indoor sports stadiums, public transport, air-conditioned restaurants, supermarkets and departmental stores.

Other legislative measures introduced included the setting of limits on the tar and nicotine content of cigarettes sold in Singapore, inclusion of health warning messages on all cigarette packets and strengthening the legislation against advertising and sale of tobacco products.

These measures saw a decline in the prevalence of smoking from 20% in 1984 to 18.3% in 1992 and then to 15.0% in 1998, among adult Singaporeans aged 18 to 64 years (Tables I & II).

Recent surveys showed that smoking levels among young Singaporeans and among females appeared to be slowly rising. This is a cause for concern and emphasises the need for the authorities to be continually vigilant.

These latest findings led to the introduction of a legislation to ban the sale of tobacco products to the under-18s and a ban in smoking by minors in public. All tobacco retailers are now required to have a licence to sell tobacco products.

The intensified Healthy Living Plan in Singapore of the 90s has shown some effective results through the reduction in the overall levels of smoking, and has also provided the

direction for more intensified and persuasive efforts to modify other important risk factors and diseases, e.g. diabetes, hypertension, physical inactivity and unhealthy diets (Table II).

Policy makers are aware that these efforts need to be sustained, effective and persuasive to reach out to an increasingly sophisticated and well-informed population.

Another disease condition which is of priority concern is cancer. It has been the leading cause of death in Singapore since the start of the 90s. Cancer now accounts for 27% of all deaths. The most common cancers in males are lung, colorectal, stomach, liver and nasopharyngeal cancer and the commonest cancers among females are breast, colorectal, lung, cervical and stomach cancer. Since breast cancer and cervical cancer have been shown to respond to early detection followed by good treatment, a National Breast Cancer Screening Programme was implemented in January 2002. There are also plans to implement a National Cervical Cancer Screening Programme. The aim of these two programmes is to reduce morbidity and mortality from breast and cervical cancers among Singaporean women.

Conclusion

The National Healthy Lifestyle Programme has been planned to be a sustained effort to reduce chronic diseases in the population. It aims to make healthy living the way of life for Singaporeans. The message to Singaporeans is that healthy living will enable them to enjoy life to the fullest, age gracefully and healthily, minimise ill health and help them retain maximum use of their physical and mental faculties to the end; hence, adding years to their life and life to their years.

The approach to the control of non-communicable diseases in Singapore can therefore be summarised as comprising the development of a comprehensive disease management framework which includes the prevention of chronic diseases and their control using an intensified programme of health promotion and early detection, through screening followed by good control using evidence-based clinical practice guidelines and focusing on a patient-centred and self-management approach. This is provided within a seamless and integrated continuum of healthcare provision, ranging from prevention, good primary, secondary and tertiary level healthcare, as well as rehabilitative and community-based health services.

Through such an approach, the programme for the control of non-communicable diseases in Singapore can be said to be a well-designed, multipronged and comprehensive one. The success of such a national approach will unfold as the Programme continues to be monitored and evaluated on an ongoing basis.

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