

CONCEPTUAL FRAMEWORK FOR CHRONIC DISEASES OF LIFESTYLE IN SOUTH AFRICA

Krisela Steyn^a

1. INTRODUCTION

The quadruple burden of diseases in South Africa has serious consequences for the prevention and cost-effective management of chronic diseases and the unhealthy lifestyles and risk factors that precede them. The disease patterns in this region are characterised by a combination of poverty-related diseases together with the emerging chronic diseases associated with urbanisation, industrialisation and a westernised lifestyle. This double burden of diseases is exacerbated by high injury rates associated with the social instability of violence or high crime rates, and by the exploding epidemic of HIV/AIDS across the African continent. This multiple burden represents a demand on the health services of South Africa far beyond those experienced in developed countries and what the limited resources can accommodate. Because little recognition is given to the magnitude of the burden of chronic diseases of lifestyle (CDL) in South Africa, and prevention of unhealthy lifestyles, early diagnosis and cost-effective management of CDL risk factors are low on the list of priorities in relation to the other competing groups of diseases. The consequences for health care are inadequate preventive measures and care for CDL. Therefore, it has become critical that South Africa utilise its limited resources optimally and implement cost-effective health-promotion interventions to prevent the predicted epidemic of CDL in the face of all the other health needs in this region.^{1,2}

2. INTERRELATED ASPECTS OF AN UNHEALTHY LIFESTYLE, EMERGING RISK FACTORS AND THE RESULTING CHRONIC DISEASES

The three most relevant elements of the unhealthy lifestyle predisposing to the development of chronic diseases are the long-term use of tobacco products, the lack of regular aerobic exercises during adult life and the consumption of an unhealthy diet over many decades. The latter refers to a diet resembling that of most developed westernised countries and consists of high levels of saturated fat, particularly of animal origin, and an imbalance between the different polyunsaturated fatty acids. This diet is also very high in sodium (salt), cholesterol, alcohol, sugar and energy intake, and very low in fibre, vitamin and trace element intake.

The adoption of an unhealthy lifestyle as set out above is later followed by the emergence of a range of CDL risk factors such as obesity, hyperlipidaemias, hypertension, diabetes, and tobacco addiction. These risk factors in their own right contribute to a range of disease processes like atherosclerosis, end-organ damage and the development of neoplastic cellular changes, which include tobacco- and nutrition-induced cancers, stroke, ischaemic heart disease, chronic obstructive pulmonary disease, emphysema, renal disease, cardiac failure and other end-stage diabetes complications, osteoporosis and liver cirrhoses. The interrelationships of the unhealthy lifestyles, risk factors and the resulting diseases are shown in Fig. 1.³

These interrelationships of unhealthy lifestyles, risk factors and the resultant chronic diseases emphasise the need to plan integrated comprehensive intervention programmes to manage chronic diseases in South Africa. Consequently, while acknowledging that each aspect of an unhealthy lifestyle and each risk factor require specific interventions, it would be inappropriate for a country's health services to develop intervention programmes focusing only on one risk factor or chronic disease without considering all the aspects of an unhealthy lifestyle and CDL risk factors. Such a single-minded

^a Director to the Chronic Diseases of Lifestyle Unit, Medical Research Council, and Honorary Professor, Department of Medicine, University of Cape Town

approach could only have a limited impact in reducing the burden of CDL in South Africa. The biggest impact will be made by an integrated approach that promotes all aspects of a healthy lifestyle, including the early diagnosis of all CDL risk factors and their cost-effective management to reduce and postpone these diseases.

Another aspect is the synergistic effect that multiple CDL risk factors have in patients when considering all the risk factors in an integrated way. For example, the impact on total risk to develop cardiovascular diseases (CVD) grows exponentially as the number of risk factors increases in individual patients. Large cohort studies have enabled the development of formulae to express the total risk for patients or groups of patients who may have a CVD event in the future, by quantifying the impact of all the risk factors present in individuals. The most common total risk assessment formulae are based on data from the Framingham study conducted in the United States of America.⁴ The total risk is usually expressed as the percentage chance of having a CVD event in the following 10 years.⁴

Two aspects of the total CVD risk formulae are of significance for South Africa. The first aspect addresses the applicability of formulae, such as the Framingham, to people from African origin, as they were developed in cohort studies on westernised people from mainly Caucasian origin. It is unlikely that a large cohort study similar to the Framingham study will be conducted in the resource-poor countries of sub-Saharan Africa to either generate regional appropriate formulae or validate these formulae for people of Africa. The second aspect involves a cost-effective approach for a country with scarce resources. This is achieved by the identification of those people who have the highest total risk of developing CVD in the future. These high-risk individuals would glean the most benefit through treatment in this community. Consequently, this approach will provide the best use of scarce resources.

However, these total risk calculations require determining serum total cholesterol levels and, at least, fasting blood glucose levels. These biochemical markers are frequently too expensive for poor countries. The need to develop total risk assessment formulae based on easily and cheaply measurable CDL risk factors is thus illustrated. These new formulae, however, would have to be validated in large cohort studies in developed countries where the necessary resources are available.

3. UNDERLYING INFLUENCES ON EMERGING CDL RISK FACTORS

3.1 Urbanisation

The impact of urbanisation on the emergence of CDL risk factors in sub-Saharan African countries is one of the major influences on the population, which is undergoing unprecedented levels of migration from century-old traditional lifestyles in rural areas to the large peri-urban settlements of cities in the region. Urbanisation has an effect on almost all the aspects of the migrants' lifestyle that contributes to increasing levels of CDL risk. This includes the influence on the migrants' diets, exercise patterns and the amount of tobacco products they use. In most cases reported, the diet of people in urban settings is more energy rich, with a higher salt, fat, and processed sugar-based intake, while fibre and potassium intake is lower because of less fruit and vegetables, than found in rural settings.⁵ Most studies have also shown higher rates of tobacco use in the cities than in rural settings. In the urban settings, people tend to do less aerobic exercise. They use public transport and thus walk less, tend to do less labour-intensive work, and tend to watch television even in the poorer urban settings, compared to those living in rural settings.

Some examples of urban:rural CDL risk factor comparisons in South Africa will be discussed in the sections on the specific risk factors. However, a well-designed Kenyan study by Poulter and others is worth mentioning here. In a longitudinal migration study in Kenya Luo migrants who moved from a setting with low blood pressures (BP) to the city, Nairobi, had an increased BP after 6-12 months. An increase in salt consumption measured as an increase of the urinary sodium:potassium ratio, increased weight and pulse rate were also associated with the higher BP. Migration to an urban setting is a stressful life event and the increased pulse rate observed in the migrants suggests increased experience of stress compared to what their rural counterparts experienced.^{6,7}

A number of cross-sectional studies in South Africa have shown that the people who have spent a larger proportion of their lives in an urban setting had significantly higher rates of diabetes, hypertension and smoking tobacco (women only) than those who had spent only a small proportion of their lives in the city.^{8,9}

3.2 Globalisation, the media and advertising

The influence of globalisation and the media on South Africa and other countries in the region is of particular importance to the emergence of CDL risk factors in the region. This is most prominent for tobacco consumption in the region. As tobacco-control initiatives in the developed world increased dramatically, the tobacco industry needed to find new markets for their lethal products. With aggressive marketing, they soon succeeded in establishing such markets outside the developed countries by portraying young smokers as being successful in many spheres of life. For many people in the developing world cigarettes became an accessible way to participate in what is perceived to be the desirable westernised (American) lifestyle. In documentation of the tobacco industry available online, decisions on these websites indicate that policies of international companies in developing countries, including sub-Saharan Africa, involved setting up joint ventures with the smaller local tobacco companies. These would allow cheaper local tobacco brands to function as 'entry' products, while the imported higher-priced brands associated with social and economic success were actively advertised. Young adult smokers, and males and females in urban and cosmopolitan settings are their main targets.¹⁰⁻¹² Fortunately, South Africa's strict tobacco products control act and increased tax on tobacco products have provided the country with more protection against many of the multinational tobacco companies' initiatives than has been the case in other developing countries.

Globalisation also influences nutrition patterns in South Africa with the establishment of activities such as Coca Cola sales and the replacement of traditional beer with industrial beer of westernised countries across the continent of Africa. McDonald's opened their first outlets in South Africa in 1995 and by the end of 2002 had about 100 branches in the country, with plans to expand to other countries in the region. However invasive these activities may be, it is probably the media and their extensive advertising that influences people of Africa to move away from their traditional African diets and aspire to the typical Western diet. It is interesting to note that the traditional African diets have not achieved the same status throughout the world as those achieved by many Asian diets.

Behind the media activities are the large trans-national corporations whose influences are enormous, with budgets larger than that of some countries in sub-Saharan Africa and who back free trade. They promote the abolishment of agricultural subsidies in these countries and support the importation of cheaper, frequently subsidised, foods and other goods from the industrialised countries. This promotes the loss of food security of many small rural farmers who grow local staple foods, which have become more expensive than the subsidised imported foods. This drives the farmers off the land to the peri-urban settlements where the new lifestyle promotes the emergence of CDL risk factors. Furthermore, the increasing consumption of nutritionally poor products of large trans-national corporations, such as salt-rich snacks, or sugar and soft drinks results in the replacement of the intake of healthy local produce, for example milk, fruit or vegetables.

3.3 Agriculture

In sub-Saharan African countries, discussions about agriculture focus more on inadequate cultivation of sufficient food to maintain food security and prevent under-nutrition and starvation.¹³ There are, however, a number of agricultural factors related to the emergence of CDL risk factors in the region that also plays a role. The cultivation of tobacco is of major importance to countries such as Zimbabwe, Malawi and Tanzania that grow tobacco on more than 1% of agricultural land. In South Africa the cultivation of tobacco decreased significantly during the last few decades. This is because tobacco companies could import tobacco from Zimbabwe and Malawi at lower prices. However, the cultivation of tobacco in the region has a major impact on agricultural patterns. The curing of tobacco, for instance, uses wood as fuel in the larger tobacco-growing countries. During 1999, 16% and 26% of deforestation was attributable to tobacco in Zimbabwe and Malawi, respectively.¹⁴

3.4 Legislation and trade agreements

The foregoing factors highlight the need for adequate legislation within countries and the necessary trade agreements among sub-Saharan African countries to protect the population against adopting an unhealthy lifestyle. Abedian et al.,¹⁵ described the requirements of an optimal policy for tobacco control in these countries, and South Africa was fortunate that President Mandela expressed strong support for global tobacco control. Consequently, South Africa passed a Tobacco Products Control Act in 1993 and added extensive amendments to strengthen the bill in 1998. The impact of this legislation has led to a marked reduction in

tobacco consumption shown both by a reduced prevalence of tobacco smoking and reduced amount of tobacco sold in the country.¹⁶ Very few other sub-Saharan African countries have high tobacco tax rates that contribute significantly to the reduction in cigarette smoking. Thus, smuggling of cigarettes between countries with high and low rates of tobacco tax has become a feature in this region.

4. LIFETIME SEQUENCE OF EVENTS INFLUENCING CDL PATTERNS

Although CDL usually present in middle age or later in life, the establishment of unhealthy lifestyles and the emergence of CDL risk factors occur much earlier. In fact, a number of factors that can influence the emergence of risk factors and CDL later in life are present in utero, or become established during childhood. Therefore, when considering the lifestyle and risk factors for CDL, it is necessary to have a life-long perspective. Fig. 2 shows this perspective along with the type of interventions and the target groups.

5. REALITIES OF THE HEALTH-CARE SYSTEM FOR CDL IN SOUTH AFRICA

A successful national CDL health-care programme consists of two elements and targets two different groups of society (Fig. 2). The first element relates to the prevention of the emergence of the CDL risk factors. The target for these activities is the population as a whole with the intention of preventing communities from adopting an unhealthy lifestyle, and is referred to as primordial prevention. Such preventive activities should use effective communication techniques, suitable to the cultural needs of the target community. The disciplines of 'Social Marketing' and Health Promotion provide successful methods that should be used to target the whole community. These preventive activities are neither the primary responsibility nor within the skills base of the health-care service providers at clinics, private practices or hospitals in South Africa.

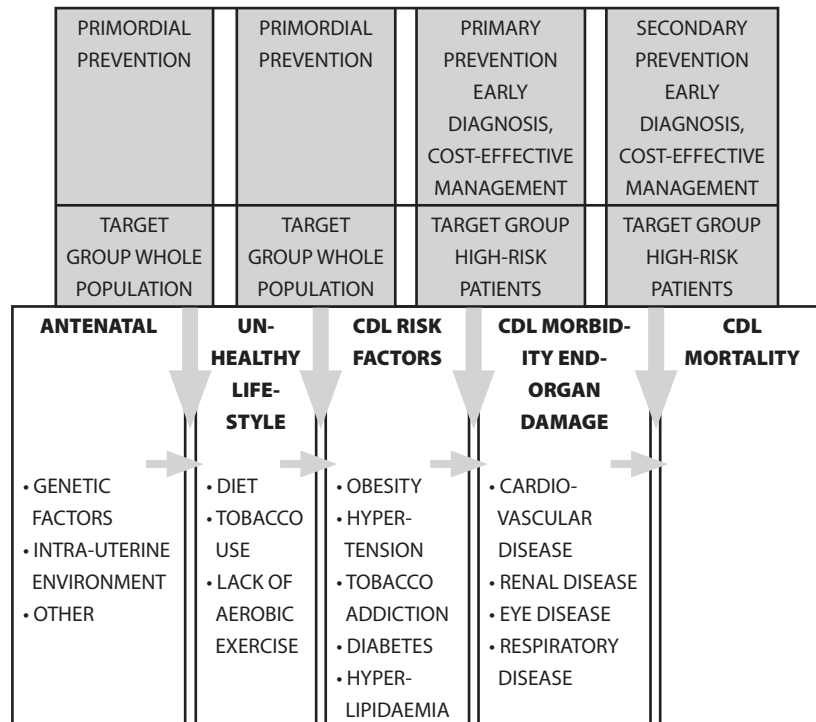


Figure 2: Lifetime perspective on the development and management of CDL

The second element relates to identifying those people in the community who have an increased risk for developing CDL, with the intention of treating and preventing the risk factors cost-effectively. This prevents damage caused to target organs in the body over decades and precedes CDL events such as heart attacks, strokes or renal impairment. This is referred to as primary prevention. Secondary prevention occurs when a patient with a CDL event is treated in order to reduce the

risk of further events. This last group of patients carries the highest risk in society for development of a CDL event, and therefore, represents the group of patients who will be most cost-effective to treat. These elements of health care fall squarely into the domain of the health-care services of countries.¹⁷

In South Africa, the focus on CDL prevention for those sectors of the society that have not yet adopted typical westernised/industrialised lifestyles is at a different phase than for those who have already adopted these lifestyles, which are also found in the high-income countries. This implies that the timing and type of interventions that are necessary for the different sectors of the South African community will vary. In typical westernised/industrialised South Africans, there is a pattern of high levels of unhealthy lifestyle habits, and CDL and their risk factors. Consequently, the focus of the successful CDL intervention programmes for these South Africans should be similar to those found in countries like the United States and Finland. The initial aim is to reduce the consumption of unhealthy foods, the reduction of use of unhealthy products like tobacco, and to increase physical activity patterns. In contrast, in South Africa for certain groups of the population the issue is still to prevent the adoption of unhealthy lifestyles that will result in CDL many decades later. This would suggest that the processes targeting the population as a whole might be of greater benefit in South Africa than was the case in the high-income countries. These actions include measures such as fiscal policies, regulations, and large public education initiatives.

5.1 Prevention of CDL risk factors

Unfortunately, prevention of the emergence of risk factors receives the least attention in South Africa's activities relating to health. Fortunately, the need for adequate prevention is the focus of the World Health Report of 2002.¹⁸

The report quantifies the global impact of several major risk factors, including some major CDL risk factors on current mortality and overall burden of disease. The report also highlights the benefit of effective interventions and emphasizes the cost-effectiveness of these in comparison to many other medical interventions commonly used in South Africa and elsewhere. Yach,¹⁹ in an editorial in the *Lancet*, argues that one should focus on current prevalence and trends of CDL risk factors, such as tobacco addiction, physical inactivity, obesity, hypertension and hypercholesterolaemia, to understand the full impact on CDL patterns that will occur decades later. This approach is particularly important in South Africa and other countries in the region, since the time involved in the 'long incubation period' is mostly ignored when planning health delivery in communities exposed to high levels of CDL risk factors and the actual increases of CDL rates. Secondary CDL prevention can also make a strong impact on patients by reducing CDL risk factors. Yach¹⁹ most pertinently asks why the public health community gives such a low priority to effective preventive measures for chronic diseases seeing that their cost-effectiveness have been shown to be so high. He suggests possible answers to the question and argues that slowing the incidence of new cases of almost entirely preventable CDL can be achieved by cost-effectively addressing CDL risk factors such as tobacco use, unhealthy diets and physical inactivity. He also emphasises the principles set out in the Ottawa Charter for Health Promotion, and the need to tackle risks together and within the social, economic, and political context of countries.²⁰ This approach to health promotion highlights another issue that is often ignored in sub-Saharan African countries when preventive actions are introduced. Frequently, health promotion material and programmes developed in the industrial world are implemented in this region without the necessary consideration of the local culture or the realities of people living in poor settings. Such an approach is doomed to fail. The only way to achieve success is to develop either new locally appropriate health promotion programmes, or carefully adopting material from other settings to fulfil local requirements.

5.2 Health-care services for CDL and their risk factors

South Africa has limited resources but an enormous burden in catering for the multiple burdens of diseases placed on the health services. When competing with the more acute and urgent conditions, such as trauma or severe illness caused by active infections, it is clear that provision for CDL services are less likely to be adequate. CDL lack urgency at every level of resource allocation and, consequently, unless a health service has a scientifically-based process of priority setting to ensure appropriate resource allocation, chronic diseases seldom receive the preventative and cost-effective care required.

Furthermore, health services in poorer countries are fundamentally based on a model of treating acute illness. Such a model, particularly in the public sector clinics catering for the poor, rarely provides appropriate health-promotion initiatives or educational needs for patients

with chronic disease. For example, the logistics of dispensing long-term medication for chronic diseases are seldom organised so that patients can obtain repeat prescriptions on a regular basis in an efficient way.

Effective CDL health care requires that the patients become active participants in their own care, as this will usually continue for the rest of their lives. The model for acute patient care, on which most countries in the region base their health-care facilities, does not incorporate the patient in an active way to ensure compliance with life-long medical treatment or the necessary lifestyle modifications. A patient-centred approach still needs to be developed for resource-scarce settings, such as the primary health-care services in the public sector of the country.

Health-care information regarding the effectiveness, or otherwise, of CDL treatments is seldom collected and rarely informs health-care services planned for the region. Therapeutic guidelines for CDL management are formulated by international agencies for global use and are frequently unrealistic for South Africa or other countries in the region with scarce resources. These countries seldom have the wherewithal to formulate their own guidelines. For example, suggested therapeutic agents are far too expensive for available budgets in South Africa. Some therapeutic guidelines target either medically qualified personnel or professional nurses with special training in CDL care. This level of staff is frequently unavailable in rural settings in South Africa. There is a real need for more realistic therapeutic guidelines with recommendations that apply to the staff and resources actually available. Furthermore, medication distribution and supplies are frequently inadequate, and result in the unavailability of the required medication at clinics. As can be expected these factors have resulted in inadequate care for patients with CDL or their risk factors.²¹

6. THE AIDS EPIDEMIC AND CDL IN SOUTH AFRICA

In South Africa, the question that must be considered is what the impact might be on the anticipated increase in CDL as the HIV/AIDS epidemic unfolds. The Actuarial Society of South Africa developed a model in 2000 (ASSA2000) to project how the AIDS epidemic could affect the patterns of mortality. The ASSA2000 model projects a tremendous increase in the mortality of young adults,²² and was used to assess and project what the CDL mortality might be in 2010. These projections are shown in Table 1.1.

Table 1.1. Projected number of deaths per day in South Africa based on the ASSA2000 demographic and AIDS model²²

Group of diseases	2000 (ASSA2000)	2010 (ASSA2000)	2010 AIDS treatment model (ASSA2002)*
Group 1 Infections, maternal, perinatal and under nutrition conditions	317	287	252
AIDS	454	2184	1050
Group 11 Chronic diseases	565	666	618
Group 111 Injuries	189	184	173
Total deaths	1525**	3322	2154

ASSA=Actuarial Society of South Africa

* The ASSA 2002 AIDS treatment model assumes prevention and treatment of 50% of AIDS patients in South Africa

** Without correction for the underreported deaths; 1265 deaths per day were registered in South Africa in 2000.

The projected mortality, expressed as deaths per day, attributed to AIDS is projected to increase from 77 per day in 1996 to 2184 per day in 2010. It is projected that during the same period the 487 chronic disease deaths per day in 1996 will increase to 563 per day, despite the enormous increase in projected AIDS deaths. This clearly suggests that irrespective of the deaths attributable to AIDS, there will be a slight increase in the mortality in South Africa attributed to CDL that will continue to play a significant role in South Africa and require prevention and cost-effective management.

The effect the high AIDS mortality in young adults in sub-Saharan African countries has on older people must be major. These older people with the higher CDL rates and risk factors not only have to care for their adult children suffering from AIDS, but also for their orphaned grandchildren. Although not yet formally evaluated, the impact this has on the quality of care for the middle-aged and elderly people with CDL must be extensive. As a result of the changing family structure and through the premature loss of their children, who traditionally would have cared for them in their old age, they are emotionally drained.²³ Furthermore, the funds available to the elderly previously used for food, water, electricity and visits to clinics and hospitals is limited and will impact on the care that is already insufficient for their chronic diseases.

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