2

Cardiovascular risk: priorities for treatment in a world-wide context

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Introduction

A quick survey of the titles of medical reviews on cardiovascular risk reveals several hundred publications within the last decade. Great emphasis is placed on the importance of hypercholesterolaemia, hypertension, diabetes mellitus and smoking, and more recently the additional contributions of dietary status (particularly of anti-oxidants), hypertriglyceridaemia, iron and magnesium status, fibrinogen levels, hyperhomocysteinaemia and many others.

The present review is most certainly not encyclopaedic, neither is it my intention even to try and draw together so many strands when considering cardiovascular risk in a world-wide context. My purpose is simply to assess the possibilities of preventative health care programmes for cardiovascular disease in different parts of the World.

Smoking

In the last decade there have been many authoritative and reliable surveys of smoking patterns around the world, but earlier data of the same quality is sadly lacking. One consequence of this is that it not possible to get an overview of the changes in smoking patterns in most countries. Existing data however reveal an alarming increase in tobacco consumption in the third world, particularly in China and many other parts of Asia. In developing countries more men (50-60%) than women (2-10%) smoke, whereas in developed countries about 25-30% of both men and women smoke[1]. Most smokers in both the developed and developing world start to smoke before the age of 18, although boys start to smoke a few years earlier than girls. A particular concern is the pattern of smoking in developing countries which emerges from statistics published by the Food and Agriculture Organisation of the United Nations. Between the years 1974-76, about 49% of the world consumption of tobacco was in developing countries. This increased to 61% between 1984-86, and it is estimated that it will reach 71% by the year 2000[2]. Between the years 1986 and 1991, tobacco consumption declined in Africa by 11%, in North America by 13%, in South America by 7% and in the European Community by 3.5%. However, during the same period tobacco consumption in Eastern Europe increased by 2% and in Asia the increase was an alarming 13.5%. More than half of the cigarettes manufactured in the world are smoked in Asia, and this proportion is increasing at a greater rate than the changes in population[2].

Estimates have been made for smoking related deaths world-wide, assuming that the present trends of tobacco consumption will continue for another 30 years. At present, about 3 million deaths may be attributed to tobacco smoking each year, and this will rise to 10 million by 2025, of which 7 million will be in developing countries. Of this appalling number, 2 million will be in China alone[3].

The reasons for the increase in tobacco consumption in developing countries have been discussed elsewhere[1], and are likely to include (i) an increase in the population of third world countries which is estimated to reach 7.1 billion by 2025[4], (ii) increasing affuence and spending power, especially among the young, (iii) increasing consumption by women following reduction in the social taboo of smoking in some cultures, (iv) ignorance of the health risks, (v) lack of funding for control measures and educational programmes, and (iv) the intensive marketing by multinational tobacco companies.

About 75% of men in China over the age of 25 smoke cigarettes, and there will be totally inadequate

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health care provision to look after them in a few years time. Very significant sum of money will be required for the management of the inevitable increase in cardiovascular disease. Lung cancer will remain largely untreatable for the foreseeable future, and many will die prematurely. The burden of tobacco consumption on health care services will be felt most by those looking after myocardial infarction, stroke and peripheral vascular disease. The incidence of such diseases may not be high in the Far East at present, but with increasing affluence, a higher animal fat intake and more obesity, the stage is set for a tragedy of very great proportions.

Costs of health care: the example of hypertension

The wealth of nations may be measured in many ways, but the gross national product (GNP) gives as good a marker as any of the disposable funds from which money for health care may be taken. The proportion of GNP that is diverted to health care varies greatly between nations, but is unexpectedly higher among wealthy nations than poor ones. Between 1960 and 1985 over 10.5% of GNP in the USA was spent on health. This figure compares with about 8.4% in Canada, 6% in the UK and 4.6% in Greece[5]. It seems that not only is there more money in rich countries, but a greater proportion of it is diverted into health.

Once the budget for health care is set, many factors influence the availability of funds for any particular project. In the third world, none has greater impact than cost of imported drugs. Furthermore, the trend among doctors in developed countries to prefer the improved but more expensive agents of recent years filters down to prescribing practices in developing countries. Taking for example the national cost of anti-hypertensive agents used in France in 1972 and comparing them with the costs of such agents used 15 years later, the total expenditure increased from 0.5 billion FF in 1972 to 6.5 billion FF in 1987. During the same period, the total number of prescriptions increased about 4 fold (from 9.8 to 41 million per year), but the cost increased 13 fold[5]. Clearly more prescriptions were written, and perhaps more patients were treated, but the bulk of the increased cost reflects the fact that Ca channel blockers and ACE inhibitors are more expensive than reserpine, sympatholytics and thiazide diuretics.

Diabetes

The impact of the spiralling costs of modern treatment in health care in the third world is felt most acutely in the management of common diseases that respond well to treatment. This issue has been addressed in Tanzania, which is among the poorest countries in the world. Studies at the Muhimbili Medical Centre in Dar es Salaam have identified the problem clearly[6].

Government health care expenditure in Tanzania in the years 1989-90 was about $47.4 million (US) per year, which represents about 2.7% of GNP. The population of the country at that time was 23.2 millions, which allows about $2 per person per year.

The national diabetes programme provides $287 per patient who is on insulin, and for those diabetics managed with diet and/or oral hypoglycaemic agents, the cost is $103 per year. The contribution of imported insulin to the total cost of the programme is therefore very great, and when considering outpatients alone the cost of insulin amounts to about 32% of the total. In contrast, the cost of the doctors and nurses adds up to no more than about 0.2%.

In national terms, the sums required are not matched by the sums available, and since the average income in Tanzania is only $160-200 per year, there are no funds in most families for private health care. The authors concluded[6] that "diabetes places a servere strain on the limited resources of developing countries. If African patients with diabetes have to pay for their treatment, most will be unable to do so and will die".

Hypercholesterolaemia

There is now very compelling evidence that the adequate treatment of patients with mild to moderate hypercholesterolaemia reduces the incidence of myocardial infarction and death from all cardiovascular causes[7]. In the context of primary prevention in the third world, the issue however is simply one of cost. Specifically, to reduce the number of deaths from cardiovascular disease by one, it is necessary

to treat 714 such patients for a year[7]. The cost of pravastatin treatment at a dose of 40 mg daily for 1 year is approximately $1,100 (US), so to save one life the cost exceeds $750,000. In most countries of the world, including also many developed countries, the cost of such treatment far exceeds the sums of money that are available.

Changing trends

Interesting and quite complex trends have been identified in the changing patterns of cardiovascular risk in different parts of the world. The International Clinical Epidemiology Network (INCLEN) examined the relationship between cardiovascular risk factors and socio-economic variables in each or 12 centres located in 7 countries round the world[8]. Several centres showed a positive association of body mass index and serum cholesterol with socio-economic status. These were predominantly in rural and urban SE Asia and in China. For blood pressure and cigarette smoking in the third world, the association with socio-economic status tended to be negative, which is more or less in line with the pattern of association seen in the developed world.

These data are very valuable, particulary in the context of diet and smoking habits. The tendency for an "improved" socio-economic position to be associated with obesity and a rise in serum cholesterol suggests the need for educational programmes, particularly among the young. With regard to tobacco consumption, the alarming increase in cigarette smoking particularly in China and parts of South East Asia may indeed reduce slowly as socio-economic circumstances in these countries improve. In the short and medium term however, the situation remains critical since the necessary change in national economic circumstance will take many decades, whereas the predicted increase in cardiovascular deaths due to smoking will be greatest in the next 10-20 years.

Conclusions

Crude estimates of mortality provide only a limited view of the global burden of disease. In order to provide for meaningful comparisons between the impact of different diseases on the totality of human suffering, the concept of the DALY (Disability-Adjusted Life Year) has been introduced. DALYs therefore are the sum of years of life lost because of premature mortality and years of life lived with disability, adjusted for the severity of the disability. Looking at the global pattern of disease, several points emerge. The greatest burden of disease world-wide (measured in DALY score) is due to ischaemic heart disease followed by depression, with road traffic accidents as a close third[9]. Cerebrovascular disease is forth, chronic obstructive lung disease is fifth, tuberculosis is joint sixth, and thereafter the contribution of any paticular disease is comparatively small.

In historic terms, the few years since the second world war have seen an extraordinary (although alas inadequately documented) change in the pattern of disease world-wide. The impact of antibiotics and immunisation programmes has reversed the prevalence of infectious diseases and cardio-vascular disease. As a consequence, both the developed and developing world now face together the problems highlighted by our increasing knowledge of the risk factors that trigger arterial disease. Looking simply at the present numbers of deaths world-wide that may be attributed to individual risk factors[9], the most significant risk factor is malnutrition, followed by tobacco consumption, with hypertension in third place and inadequate public sanitation and hygiene in fourth. Neither diabetes nor hyperlipidaemia are in the top 10.

The priorities for addressing cardiovascular risk remain problematic however. A superficial examination of the issues might lead one to recommend a prohibition of tobacco importation into China. The reality however is that China is now the largest single producer of tobacco in the world, and a considerable proportion of its population is dependent on the tobacco industry for its livelihood. An educational programme is clearly needed to point out the hazards associated with smoking, but at the same time alternative industries must be introduced to provide work for the population. If the present pattern of smoking in China and SE Asia is not reversed however, the consequences will be truly apocalyptic.

The treatment of hypertension is inexpensive provided the classes of antihypertensive agents used are selected with care. The benefit of treating hypertension is very great, and the disease is very common. It makes more sense therefore to treat a

large cohort of hypertensives with thiazide diuretics (even if somewhat inadequately) that to treat a selected few with ACE inhibitors or calcium channel blockers. At present, there is no possibility (and perhaps no need either) to treat hypercholesterolaemia in most countries of the world. The benefits in terms of both primary and secondary prevention of myocardial infarction are now established, but the problem of the costs involved (even in the richest countries of the world) has not been resolved.

Diabetes remains one of the great unsolved problems in terms of cardiovascular risk in a global context. The issue quite simply is the cost of insulin, and the requirement in most countries of the world for foreign currency to buy it. Imaginative and important projects, like that at Muhimbili, have identified the magnitude (and cost) of the problem; it now remains for the health economists (and the rest of us) to resolve it.

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