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COMMENTARY

Secular trends in cardiovascular disease

S Nadar and GYH Lip
University Department of Medicine, City Hospital, Birmingham B18 7QH, UK

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With changing times, come changes in the standards of living, and with it, changes in the overall health of the population. We have certainly come a long way from the Middle Ages and the early days of the industrial revolution, when overcrowding and sudden unplanned urbanisation led to the spread of many diseases and a short life expectancy.[1] Since the beginning of the 20th century, improvements in hygiene, urban planning, and overall better standards of living, brought about an improvement in health care, and life expectancy.[2] These changes, however, are dependent upon a lot of factors and can be rather different for different parts of the same country,[3] as well as for different countries of the world.[4]

Improved health parameters

In the Western world, increased life expectancy has been attributed to better hygiene and nutrition, as well as easier and quicker access to medical services, and overall better standards of living. Due credit should be given to advances in therapeutic options.

Indeed, newer therapeutic measures in cardiovascular medicine have been introduced that have substantially influenced our current management approach. For example, thrombolytic therapy and (more recently) advances in percutaneous coronary angioplasty have revolutionised the way acute myocardial infarctions are managed. Many studies have also shown the importance of risk factor control, such as better and tighter blood pressure control, diabetes control and recently the use of statins and angiotensin-converting enzyme (ACE) inhibitors.

Thus it is pleasing, even to the most cynical of clinical pharmacologists, that the mortality and morbidity rates in the Western world for cerebrovascular disease,[5–7] and cardiovascular disease[8] have shown definite downward trends. Are we getting better at improving health, or are we improving disease prevention? Indeed, amongst patients presenting with a stroke,[9] many more are already on treatment for their risk factors (such as hypertension and atrial fibrillation) than they were a few years ago. Such enthusiastic preventive measures have resulted in over 6000 fewer deaths from coronary heart disease in 1994 as compared with 1975, and this was almost entirely due to risk factor reduction and medical management.[10] Similarly, the outlook for patients admitted with a first ever episode of atrial fibrillation has been shown to be better now than what it was 10 years ago.[11]

Developed *vs* developing countries

Figure 1 shows the change in mortality for cardiovascular diseases over the last 30 years in some countries from the Western world. It is encouraging to note that all these countries show a decreasing trend for cardiovascular mortality. However, data from countries such as Hungary,[12] India[13] and the USSR[14] show that mortality rates are actually *increasing*. This is in keeping with an increase in the number of patients in these countries with coronary risk factors such as hypertension, diabetes and smoking.[15,16]

One reason for this contrast is that in the developing countries, the widespread use of antihypertensive agents to control blood pressure led to a lower average blood pressure in the community. This fact is well demonstrated in Figure 2, where the changes in mortality are seen in the United Kingdom (which most would regard as a 'developed' country from the health services aspect!), depending upon whether it was pre-1970 or afterwards. The year 1970 is taken as a 'cut off' by many epidemiologists interested in such secular trends in cardiovascular mortality, as it was after the early 1970s that the use of antihypertensive agents became widespread. The improved treatment of hypertension, along with

Correspondence: GYH Lip, University Department of Medicine, City Hospital, Birmingham B18 7QH, UK.
E-mail: G.Y.H.LIP@bham.ac.uk

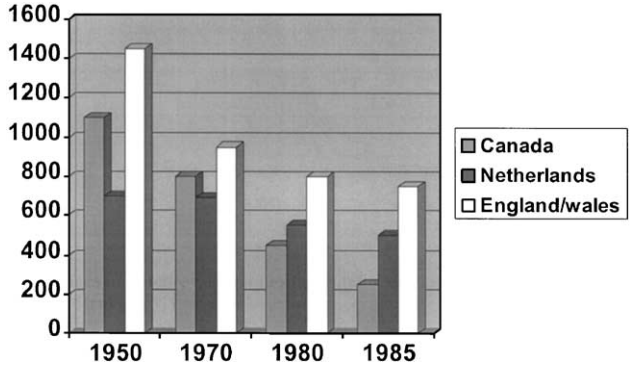

Figure 1 Changes in cerebrovascular mortality in three countries from 1950 to 1985 in males aged 50 to 60 years.[31]

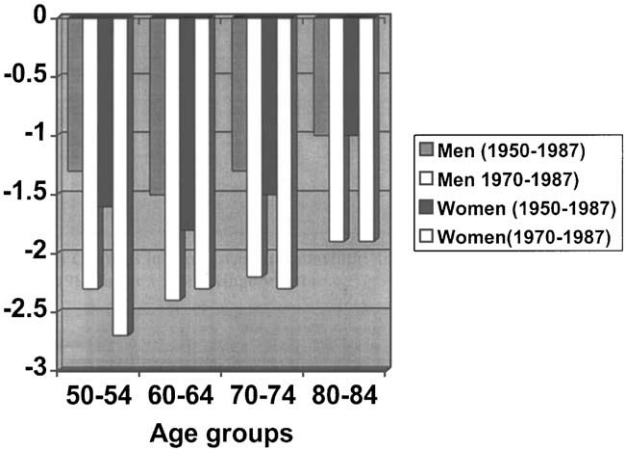

Figure 2 Percent changes in cardiovascular mortality in men and women for the period 1950–1985 in the UK.[31]

control of other risk factors, are probably major factors responsible for the reduction in overall cardiovascular mortality.

The Framingham study[17] showed that the prevalence of hypertension rose in men aged >60 years in 1950–1970, by about 80 per 1000 but this was associated with an increase in treated hypertensives by 51% in men, and by 45% in women over the same period. These observations were also confirmed by studies from other Western countries such as Denmark[18] and Sweden.[19] Rather than health improvements, perhaps disease prevention is more likely, as the Framingham data[20] reporting secular trends in atrial fibrillation have reported broadly similar results.

Nevertheless, the increasing prevalence of hypertension and an increase in mortality in the developing world could partly be due to greater awareness of health and education by the general public. Thus, rather than an actual increase in the number of people with a high blood pressure, the figures could simply reflect a higher number of patients actually seeking medical advice, as compared with many years ago. Figure 3 highlights this point, as in India the prevalence of hypertension was very low in 1950 and increased to around 14%. In contrast, the United States starts with a high prevalence of hypertension in the 1950s (around 20%) and in the 1990s the prevalence is now similar to that seen in India. Some countries are blessed with a low burden of hypertension, such as Sweden,[19] which had a low prevalence of hypertension in the 1950s, that is even lower in the 1990s.

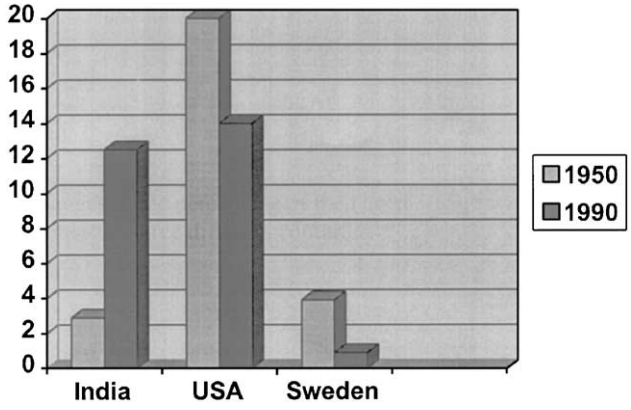

Figure 3 Changes in the percentage of men aged 50–60 years with blood pressure above 140/80 mmHg in three different countries.

Perhaps the ageing population in the Western world partly explains the secular trends in cardiovascular disease and stroke. The average life expectancy in the Western world is now above 70 years[2,4] and in England it has been projected that soon there would be more people aged over 50 years, than those under 50 years.[21,22] The increasing age of the population is understandably associated with an increase in the prevalence of disorders associated with the elderly, such as atrial fibrillation, hypertension, diabetes, etc, perhaps increasing the public health burden.[23]

Implications for health planning

Appreciation of the secular trends in cardiovascular disease and stroke has many implications for the planning of health services resources. With the newer strategies for the primary prevention of cardiovascular disease, and the recommendations for more widespread use of drugs such as the ACE inhibitors, and statins, in the wake of recent studies such as the MRC/BHF Heart Protection study,[24] HOPE[25] and PROGRESS,[26] there will be an increasing drain on drug budgets. Studies have also shown an increasing number of (older) patients admitted with an acute stroke are already on optimum treatment for their risk factors such as hypertension and atrial fibrillation.[9] Melzer *et al*[27] studied disability in old age in comparison to their social class, and found that elderly people who were in the

more privileged social groups had longer disability-free years than others, which was in proportion to their longer life expectancy—perhaps suggesting that the longer life in these social groups was not associated with an increased social or economic burden.

Do the benefits start young?

Perhaps it would be worth trying to exploit this trend for lowering blood pressure and investing more in the health of the younger people. Indeed, it would be interesting to see whether the increased life expectancy, and the increase in general health and standards of living have any significant effect on the health of the younger population.

In the current issue of the *Journal of Human Hypertension*, McCarron *et al*[28] have addressed this very point. They undertook a systematic review of the trends in blood pressure changes over the last 50 years in the 5 to 34 year age group in the Western world, and found that amongst adolescents (aged 5 to 18 years), the blood pressure has declined by an average of 0.65 mmHg systolic and 0.23 mmHg diastolic per year, and amongst young adults (aged 19 to 34 years) by 0.26 mmHg systolic and 0.10 mmHg diastolic per year. They suggest that although these appear to be small reductions, the changes have significant clinical implications in the long run. Indeed, lower blood pressures in youth have been associated with lower incidences of cardiovascular diseases in later life.[29,30]

McCarron *et al*[28] have also tried to investigate the many reasons for lower blood pressures among youth, which include an increasing birth weight (which has been shown to be associated with lower subsequent blood pressure), improved quality of health and nutrition in early childhood, etc. They also suggest that these reductions in blood pressure could in turn explain the declining mortality rates for stroke and coronary heart disease in the Western world.

This suggestion, however, should be viewed with some caution, and cynical clinical pharmacologists may need to be pacified. Certainly, one has to bear in mind the various confounding factors, such as early diagnosis/treatment and preventive strategies, better awareness among the population, etc. However, what needs to be examined at some time in the future is whether the lower blood pressure in the younger population is associated with a later date or age of onset of hypertension and its complications.

Conflict of interest statement

SN and GL have received honoraria for lecturing and educational symposia, as well as research funding from various manufacturers of antihypertensive agents.

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