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The changing patterns of chronic kidney disease: The need to develop strategies for prevention relevant to different regions and countries

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The changing patterns of chronic kidney disease: The need to develop strategies for prevention relevant to different regions and countries. Chronic diseases are now in pandemic proportions and are the major cause of morbidity and mortality worldwide. Long-term predictions show that the burden will fall increasingly on developing countries. Type II diabetes is now the major global cause of chronic kidney disease. However, chronic kidney disease should not be viewed in isolation, because it is also a major risk factor for cardiovascular deaths.

It is both a medical and economic imperative to introduce screening and management programs for chronic kidney disease, diabetes, hypertension, and cardiovascular disease worldwide but particularly in the emerging world. Such programs should be tailored to the needs of the individual country, involve local health providers, be assessable as to their efficacy, and become self-sufficient within 5 years.

Chronic diseases are now in pandemic proportions and are the major causes of morbidity and mortality worldwide [1, 2]. The World Health Organization (WHO) estimated that in 2003, of 56 million global deaths, 60% were due to chronic disease. The global prevalence of chronic disease is rapidly increasing, particularly in the developing world, mainly due to the changing pattern of disease from infectious to chronic diseases following economic development and industrialization. According to data from a recent WHO report [3], in the world's most populous country, China, the age-specific death rate from cardiovascular disease has increased 100% to 300% over the last 2 decades. India, the second most populous country, has the highest number of patients with diabetes in the world, and annual coronary deaths are expected to reach 2 million by 2010. The global number of individuals with diabetes in 2000 was estimated to be 171 million, and projected to 366 million in 2030 [4]. The estimated global dialysis population for end-stage chronic kidney disease is over 1.1 million and will be 2 million by the year 2010 [5], expanding at a rate of 7% per year, with an aggregate cost of more than US $1 trillion [6]. In developing and developed countries, chronic disease is now the principle cause of disability and the greatest user of health resources. The overall cost of chronic disease is so profound that it will reduce productivity and significantly reduce economic growth in individual countries and regions, especially in the developing world. Long-term predictions show that the burden will increasingly fall on developing countries. Already, 72% of deaths from all chronic diseases occur in low and middle income countries. Mortality from ischemic heart disease and stroke will nearly triple in Latin America, the Middle East, and sub-Saharan Africa [3]. Thus, the major impact of the epidemic of chronic disease will be in emerging countries. However, universities and their teaching programs, as well as policy makers, health providers, aid organizations (nongovernmental organizations), and academics, have paid scant attention to this problem and its prevention.

As a consequence of this changing disease profile from infectious to chronic diseases, we are now experiencing a change in the cause of end-stage kidney disease. Type II diabetes is now the major cause of end-stage renal failure worldwide, both in the developed and the emerging world. Thus, type II diabetes, potentially a preventable disease, now causes more end-stage renal disease globally than glomerulonephritis.

What can be done to address this problem of an inexorable increase in chronic diseases and their enormous global medical and economic implications? The diabetes pandemic must be recognized by health providers as a major health threat of the 21st century [7]. The statistics are stark. Paradoxically, the predominant increase will be in the emerging world, where those least able to afford and cope with the problem will be affected. There will be an 88% increase in the number of people with diabetes in Latin America, a 98% increase in Africa, and a 91%

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increase in Asia over the next 25 years. This compares with an estimated increase of 18% in Europe and 59% in the United States.

Diabetes affected 2.8% of the global population in 2000, and this will triple to 6.8% by 2030. By 2030, 81% of those with diabetes will live in the developing world, almost 3 times the rate of increase compared with developed countries. WHO has estimated that the cost of diabetic care accounts for 2.5% to 15% of national health care budgets. The global cost, now about US $150 billion, will double by 2005. Countries with a high prevalence of diabetes may be spending up to 40% of their health care budget on diabetes and its complications [3]. Diabetes is not only a risk factor for chronic kidney disease but also for cardiovascular disease, and the majority of diabetic patients with kidney disease die from myocardial infarction or a stroke before reaching end-stage renal failure.

About 40% of patients with type II diabetes have chronic kidney disease reflected initially by microalbuminuria. Microalbuminuria is a very powerful independent risk factor for progression of chronic kidney disease and also for the risk of cardiovascular death. Thus, it is very important to screen patients with diabetes and hypertension for microalbuminuria. These 2 conditions account for about three fourths of the 6% of people in the community with microalbuminuria [8,9]. Treatment with either angiotensin-converting enzyme inhibition or angiotensin receptor blockade can reduce albuminuria/proteinuria and reduce the risk of progression to kidney disease and cardiovascular complications [10, 11]. Thus, there is a strong case for screening the community for early detection of hypertension, diabetes, and chronic kidney disease in an attempt to treat and slow the progression of chronic kidney disease and its cardiovascular complications.

Chronic kidney disease should not be viewed in isolation. Chronic kidney disease has a complex interrelationship with cardiovascular disease, diabetes, and hypertension. Indeed, chronic kidney disease is a major risk factor for cardiovascular disease. There is a graded inverse relationship between initial renal function and subsequent risk of death and complications from cardiovascular disease [12]. Similarly, diabetes and glucose intolerance are also risk factors for renal disease and cardiovascular disease. Albuminuria is not only a risk factor for progression of renal disease but, in addition, for cardiovascular events in patients with diabetes or kidney disease and also people in the general community [13, 14].

Therefore, it is imperative for screening and prevention programs to detect and then treat people with not only kidney disease per se but also those with diabetes, hypertension, and cardiovascular disease as well. Overall risk factors such as lifestyle, diet, inactivity, smoking, and alcohol must be addressed, and individual and community educational programs must be an integral part of the overall management plan.

Obviously the first requirement, apart from establishing disease prevalence in the community, is to try and prevent the occurrence of diabetic nephropathy itself by preventing the onset of diabetes. There have been several recent studies demonstrating that lifestyle changes involving diet and exercise can reduce the rate of progression from glucose intolerance to diabetes [15]. Thus, public education and awareness of the perils of globalization become a management imperative particularly in the emerging world. Again, politicians and health providers must be made keenly aware of the problem and the need for urgent action.

The second requirement is the need to introduce "detection and prevention" programs in the emerging world, each tailored to local requirements. These programs will involve the training of local experts, sustaining the management plan and evaluation of the outcome. This also requires partnerships with the local community, health caregivers, governments, nongovernmental organizations, and probably the pharmaceutical industry.

One of the International Society of Nephrology's (ISN) strategies under the ISN- Commission for the Global Advancement of Nephrology Research Committee is to develop guidelines which can be used as a basis for such detection and prevention programs throughout the world but particularly in the developing countries, where the greatest burden of chronic disease is falling.

The overall aim is to detect chronic disease—diabetes, chronic kidney disease, hypertension, and cardiovascular disease—and to retard or prevent its progression with effective treatment. This involves community education, prevention of disease by lifestyle modifications, early detection of disease, and treatment of established disease.

There are several basic axioms which will be followed in developing these guidelines. (*1*) The screening and treatment programs should be similar for all countries but flexible enough to be tailored to individual country's conditions and requirements. (*2*) The programs should include data collection modules to provide some basic epidemiologic data to help assess efficacy, to allow comparisons between countries, and to provide adequate follow-up. (*3*) Different frameworks will be needed for low, middle, and high income countries and for individual circumstances. (*4*) The programs should encompass not only chronic kidney disease but hypertension, diabetes, and cardiovascular disease. (*5*) The screening should be as widespread as possible and provide adequate follow-up. (*6*) Treatment should be provided for people who require it. (*7*) A data management program will be developed in Bergamo, Italy, to allow for epidemiologic evaluation of basic clinical data (nonidentifiable). (*8*) Programs

will be undertaken with varying partners, such as local health providers, nongovernmental organizations, other professional bodies, or regional or international organizations and industry, dependent on local needs. (*9*) Funding will usually require a mix of local health providers, governments, nongovernmental organizations, philanthropic organizations, and industry. (*10*) The program must be sustainable. Local input and expertise are essential, and self-sufficiency should be reached after 5 years.

CONCLUSION

Development of this practical and feasible program will require an enormous amount of commitment from everyone concerned and the cooperation of a large number of both local and global participants. The ISN will play a facilitating role wherever feasible.

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