Diabetic kidney disease: act now or pay later

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ABSTRACT

- The 21st century has the most diabetogenic environment in human history with the number of people with diabetes worldwide increasing to 380 million by 2025. The fastest rate of increase will be in developing countries.
- Diabetes is now the major cause of end-stage kidney disease globally; 20%–40% of people on dialysis are diabetic. In Australia, the number of people with type 2 diabetes starting dialysis increased fivefold between 1993 and 2007.
- We must act now at local, national and international levels to prevent type 2 diabetes; screen for early diabetic kidney disease; increase public awareness of kidney disease; treat with medications proven to reduce kidney disease progression; and promote research into and trialling of new therapies.
- The problem is global yet requires local action. World Kidney Day on 11 March 2010 is a time to intensify action on diabetic kidney disease and to continue to do so until this huge but largely preventable health burden is controlled.

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In 2003, the International Society of Nephrology (ISN) and the International Diabetes Federation (IDF) launched a booklet called *Diabetes and kidney disease: time to act*[1] to highlight the global pandemic of type 2 diabetes and diabetic kidney disease. It aimed to alert governments, health organisations, providers, doctors and patients to the increasing health and socioeconomic problems caused by diabetic kidney disease, including end-stage renal disease (ESRD) requiring dialysis and often resulting in cardiovascular death. Seven years later, the same message has become even more urgent. World Kidney Day 2010, under the auspices of the ISN, the International Federation of Kidney Foundations (IFKF) and the IDF, provides yet another chance to underline the importance of diabetic kidney disease, stress the lack of public and government awareness about the disease and emphasise that its management involves prevention, recognition and treatment of its complications. Primary prevention of type 2 diabetes will require massive lifestyle changes in the developing and developed world, supported by strong government commitment to promotional and preventive programs.

The global threat of type 2 diabetes

The 21st century has the most diabetogenic environment in human history.[2,3] Over the past 25 years or so, the prevalence of type 2 diabetes in the United States has almost doubled, with threefold to fivefold increases in India, Indonesia, China, Korea and Thailand.[4] In 2007, there were 246 million people with diabetes in the world, but that number is estimated to reach 380 million by 2025.[5] People with impaired glucose tolerance, a prediabetic state, numbered 308 million in 2007 and will increase to 418 million by 2025.[5] The increase in prevalence of diabetes will be greater in developing countries. For example, 18% of Mexico's adult population will have type 2 diabetes by 2025.[5] According to the World Health Organization, China and India will have about 130 million people with diabetes by 2025, who will consume about 40% of their country's health care budget, reducing productivity and hindering economic growth.

It was against this background that, on 21 December 2006, the United Nations General Assembly unanimously passed Resolution 61/225, declaring diabetes an international public health issue and identifying World Diabetes Day (14 November) as a UN international day; among diseases, diabetes was second only to HIV/AIDS in attaining that status. For the first time, governments have acknowledged that a non-infectious disease poses as serious a threat to world health as infectious diseases such as HIV/AIDS, tuberculosis and malaria. Diabetes is now seen as a major global public health concern — especially in the developing world, where people can least afford its impact. The first step towards better control of diabetic kidney disease must encompass public health campaigns aimed at preventing the development of type 2 diabetes.

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Diabetic kidney disease

Diabetes is now the major cause of end-stage kidney failure in both developed and developing nations.[6] It is the primary cause of kidney disease in 20%–40% of people starting treatment for ESRD worldwide.[7] In Australia, the number of patients with type 2 diabetes starting dialysis increased fivefold between 1993 and 2007.[8] In Japan, between 1983 and 2005, the increase was sevenfold, and patients with diabetes accounted for 40% of new patients receiving dialysis.[9] Thus, some 30% of the predicted 1.1 trillion dollar medical costs of dialysis worldwide for 2000–2010 will result from diabetic nephropathy.[10]

In the United Kingdom Prospective Diabetes Study (UKPDS), patients newly diagnosed with type 2 diabetes showed rates of progression between the stages of normoalbuminuria, microalbuminuria, macroalbuminuria and renal failure of 2%–3% per year.[11] Over a median of 15 years of follow-up, almost 40% of 4000 participants developed microalbuminuria.[12] In the DEMAND study, which involved 33 countries, 39% of 32 208 people with known type 2 diabetes, attending their family doctor, had microalbuminuria, and its prevalence increased with age, duration of diabetes and presence of hypertension.[13] About 30% of the UKPDS cohort developed renal impairment, of whom almost 50% did not have preceding albuminuria.[12] Reduced glomerular filtration rate and albuminuria caused by diabetic nephropathy are independent risk factors for cardiovascular events and death.[14] Therefore, a strategy to detect early diabetic kidney disease by screening for albuminuria and reduced glomerular filtration rate is the second step in taking action on diabetic kidney disease.

An added difficulty to overcome is the remarkable lack of awareness among patients about their condition. An Australian population-based survey showed that for every person known to have diabetes, there is at least one in whom diabetes is undiagnosed.[15] Another survey showed that only 8.7% of the general population were able to identify diabetes as a risk factor for kidney disease.[16] Very few patients with diabetic kidney disease are aware of their condition, with some community surveys putting patients' awareness of their disease as low as 9.4%, particularly in those with milder impairment.[17] Thus, public education is the third step required for acting on diabetic kidney disease. A long-term worldwide goal of the IFKF is for patients with kidney disease to not only be aware of their disease, but to actively participate in its management, to know their treatment objectives and to self-monitor blood pressure and other measures of disease progression.

Management of diabetic kidney disease

There is little use in screening populations or at-risk groups unless follow-up is undertaken and effective treatment is begun and assessed.[18] Fortunately, there is evidence that early therapeutic intervention for patients with chronic kidney disease or diabetes can delay onset of complications and improve outcomes. For example, the UKPDS,[19,20] Steno-2[21] and ADVANCE studies[22-24] all demonstrated that tight control of blood glucose level, blood pressure (and lipid level in Steno-2) significantly reduced incidence and progression of diabetic kidney disease. In people with type 2 diabetes, inhibition of the renin–angiotensin–aldosterone system using angiotensin-converting enzyme (ACE) inhibitors or angiotensin receptor blockers (ARBs) decreased the progression from normoalbuminuria to microalbuminuria,[25] reduced the progression from microalbuminuria to macroalbuminuria,[26] and slowed the development of ESRD.[27] Thus, the use of ACE inhibitors or ARBs is now standard therapy for patients with diabetic nephropathy, along with control of glucose, lipid and blood pressure levels. Effective management using evidence-based therapies is the fourth step in tackling diabetic kidney disease.

The fifth step is development of new therapies. Under clinical trial are many new agents with the potential to reduce renal damage and fibrosis, by, for example, blocking the formation of advanced glycation end products and other signalling pathways. Agents with different modes of action may potentially prove to be effective in large randomised double-blind clinical trials.[28]

How can we act now?

The steps to be taken are clear: campaigns aimed at preventing type 2 diabetes; screening for early diabetic kidney disease; increasing patient awareness of diabetic kidney disease; using medications of proven effectiveness; and finally, researching and trialling new therapies. The ultimate challenge is to win commitment from all involved — from providers of primary health care to those at the highest level of care; from individuals at risk to patients with advanced disease — in all countries irrespective of economic circumstances and priorities. The problem is global and yet requires local action: prevention, screening and treatment strategies; education, including increasing awareness among patients with the disease and those at risk; and changes in health priorities and government responses. Basic research and clinical trials to find new understanding and therapies must be supported.

The UN, as noted earlier, recognised the importance of diabetes in 2006 by establishing World Diabetes Day. Both the ISN and the IDF are working closely with the WHO to increase understanding of the challenge that diabetic kidney disease poses to world health and health care budgets. World Kidney Day also provides a focus for other international agencies, government ministries of health, non-government organisations, foundations and academic institutions to come together with national kidney foundations in the effort to prevent and manage diabetic kidney disease.

The ISN, through the Research and Prevention Committee of its Commission for the Global Advancement of Nephrology, has developed a web-based program — Detection and Management of Chronic Kidney Disease, Hypertension, Diabetes and Cardiovascular Disease in Developing Countries (KHDC).[29] Set up as a global template, it is a detection, management and data assessment program that has so far screened some 42 000 people in 25 developing countries; the data are being stored and analysed by the Kidney Disease Data Center at the committee's headquarters at the Mario Negri Institute in Bergamo, Italy. This program can be tailored to any individual country's needs and resources. The IFKF also runs a program — the Kidney Early Evaluation Program (KEEP), initiated by the National Kidney Foundation in the US[30] — for screening and managing people at high risk of kidney disease. KEEP has been implemented in many countries.

We hope the focus on diabetic kidney disease for World Kidney Day 2010 will help increase awareness of the magnitude of the problem and its ramifications for global health. It is time to act and act urgently. It is time for strategies that prevent type 2 diabetes and its sequelae. It is time for broad-reaching programs to ensure health care workers diagnose and effectively treat people with diabetic kidney disease. It is time for governments to pass legislation to enable the diabetes pandemic to be controlled. After all, diabetic kidney disease, like the epidemics of infectious diseases that have long dominated public health agendas, is potentially preventable. It is time to step up action on diabetic kidney disease and to sustain that action long after World Kidney Day 2010.

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Competing interests

None identified.

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