

STRATEGIES FOR REDUCING THE BURDEN OF RENAL DISEASE IN THE DEVELOPING WORLD

ROLE OF THE PRIMARY CARE PHYSICIAN IN DIAGNOSIS AND TREATMENT OF EARLY RENAL DAMAGE

In spite of all the technical advances and resources dedicated to the treatment of end-stage renal disease (ESRD), it is still a growing problem all over the world. To address this issue adequately, it is crucial to detect chronic kidney disease patients early and optimize their care. However, a lack of awareness and appropriate management of potential underlying kidney disease, even in high-risk patients, seems to be common in many parts of the world, even though many of the measures recognized to decrease the risk and slow the progression of kidney disease are most effective when initiated early. Type 2 diabetes mellitus patients (a high-risk population) with early nephropathy treated by nephrologists have better preservation of their renal function than do patients treated only by family physicians. However, referral of patients to the nephrologist at earlier stages of disease than is recommended is not always feasible. A more plausible alternative may be that general practitioners learn to diagnose and treat these patients. We have demonstrated that an educational intervention increased family practitioners' clinical competence, which resulted in preserved renal function in diabetic patients with early renal disease. Variables not well controlled either by the nephrologist or the primary care physicians are those related to lifestyle and diet. These unhealthy habits are common in Westernized societies, and primary care physicians may be the most suitably positioned to promote health. Even so, counseling by physicians is not always effective in reducing risky habits, particularly when the health team is overworked; strategies such as community resources (including support groups) may also play a role. Preliminary results of an ongoing study based on a self-help and support group strategy that is coordinated by a multidisciplinary team (family practitioner, social worker, dietician, and physical trainer) show improvements in the

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lifestyle and dietary habits of patients with overweight or obesity, diabetes, or hypertension. All these findings support the need to implement health promotion programs with the participation of multidisciplinary teams. (*Ethn Dis.* 2009;19[Suppl 1]:S1-68-S1-72)

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THE PROBLEM OF END-STAGE RENAL DISEASE (ESRD)

ESRD is a major health problem all over the world. In Mexico, as in the rest of the world, the prevalence of ESRD has been increasing. In the last 5 years, the number of patients on hemodialysis and peritoneal dialysis and transplant patients has increased by 10% every year.¹ At present, an estimated 50,000 patients are receiving dialysis.

In Mexico, there is no comprehensive national renal registry, which makes any global analysis difficult. Instead, data from some local or regional registries are extrapolated or taken as representative; the most complete is the Registry of Dialysis and Transplantation of the State of Jalisco. In Jalisco,

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incidence of dialysis or transplantation in 2003 was 280 patients per million population,² an incidence similar to that reported in developed countries such as the United States or Japan. This finding is a concern because Mexico cannot afford the costs associated with ESRD. If renal failure is to be combated effectively, efforts have to be focused on prevention, both primary and secondary.

To slow the progression of kidney failure, to prevent the consequences of chronic kidney disease, and to decrease the associated mortality and economic cost, it is crucial to detect patients with kidney disease early in its course and optimize patient care. Global organizations such as the International Society of Nephrology and the International Federation of Kidney Foundations launched World Kidney Day in March 2006, one of the principal aims of which was to raise awareness among general physicians, primary care professionals, and the general public of the role of the kidney as a source of chronic diseases and to emphasize the need for early detection of renal damage.³ However, despite these efforts and despite guidelines such as the National Kidney Foundation Disease Outcomes Quality Initiative (KDOQI)⁴ and information about patients at high risk for developing kidney disease,^{4,5} there is no documented evidence that physicians are aware of how to manage potential kidney disease in at-risk patients.^{6,7} As a first step, nephropathy must be detected early in the general population, particularly in patients thought to be at high risk.

DETECTION AND TREATMENT OF DIABETIC PATIENTS WITH EARLY NEPHROPATHY ATTENDING PRIMARY CARE MEDICAL UNITS—THE EXPERIENCE OF GUADALAJARA

Jalisco is a western state of Mexico, and the capital is Guadalajara, which has a population of ≈ 4 million. In Guadalajara, diabetes mellitus (93% of which is type 2) is the main cause of ESRD (40%–50%).⁸

We investigated the prevalence of early renal disease among diabetes patients attending primary care units of the Mexican Institute of Social Security (IMSS, the biggest health provider in the country) in a cross-sectional study.⁹ For this study, 3 of 24 medical units in the city of Guadalajara were randomly selected. From the total diabetic patient population of these 3 primary care units, we randomly selected 756 patients; we evaluated microalbuminuria by using a dipstick in a first morning void urine sample and excluded transitory causes of proteinuria. Positive results were confirmed by nephelometry in 24-hour urine collections. Kidney disease was classified according to KDOQI guidelines.⁴ We defined early nephropathy as microalbuminuria (30–300 mg/day) with normal glomerular filtration rate (GFR) or with mildly decreased GFR (60–89 mL/min/1.73 m²). Overt nephropathy was defined as macroalbuminuria (>300 mg/day) or a moderate or severe decrease in GFR (<60 mL/min/1.73 m²). GFR was estimated from the simplified equation of the Modification of Diet in Renal Disease Study.¹⁰ We found that 40% of diabetic patients had early nephropathy, 29% had overt nephropathy, and only 31% had normal function. None of these patients had been previously diagnosed with nephropathy, and most of them were not receiving renoprotective therapy.

Several measures can decrease the risk for or slow the progression of diabetic nephropathy.^{11,12} Reviewing these measures is beyond the scope of this article; however, all of them are most effective when initiated early in the course of disease. Presumably, nephrologists are more familiar than are other doctors with these measures; in fact, several studies have shown that patients who are referred early to a nephrologist have better outcomes.^{13–15} All those studies, however, evaluated referral to a nephrologist at late stages of kidney disease, when almost all the renal function had been lost. Referring patients with nephropathy to a nephrologist at earlier stages could be of more benefit, but no previous data have been published in this regard. Therefore, to determine prospectively the effect of earlier referral to a nephrologist on the progression of renal damage in diabetes patients with recently diagnosed nephropathy, we performed a cohort study¹⁶ in which 65 patients from 1 primary care unit and 52 from another unit were included. Patients from the first medical unit were treated only by family physicians and constituted the control cohort; patients from the second medical unit were treated by a family physician in conjunction with a nephrologist and constituted the study cohort. Both cohorts were followed during a 12-month period and visited their family physician every month. Patients in the study cohort were additionally seen by a nephrologist every 6 months.

Despite similar initial systolic and diastolic blood pressures, only patients in the study cohort had significantly decreased blood pressure and a trend to decreased body mass index at the end of the study, compared with patients treated by a family practitioner only. Nevertheless, metabolic control and smoking habits did not change in either cohort. Perhaps the most relevant finding of this study was that patients who were also seen by a nephrologist had significantly better-preserved renal function (serum creatinine, GFR, and

albuminuria) than did patients who were seen only by a family practitioner. This difference was even more apparent in patients with early nephropathy than in patients with overt nephropathy.

THE ROLE OF PRIMARY CARE PHYSICIANS IN MANAGING DIABETIC PATIENTS WITH EARLY NEPHROPATHY

The previous findings might suggest that referral to a nephrologist should occur at earlier stages of kidney disease than is currently recommended.⁴ However, this suggestion is not always feasible, depending on a country's circumstances and health systems. In Mexico, the number of nephrologists (502 certified by the Mexican Board of Nephrology)¹⁷ is small relative to the number of patients that potentially require evaluation (11 million diabetic patients). A more plausible alternative is that general practitioners or family practitioners could diagnose and treat these patients; however, they must first demonstrate clinical competence in interpreting renal disease tests and tailoring therapy.

In evaluating the clinical competence of physicians, at least 3 points should be considered. First, clinical competence reflects the relationship between a person's abilities and the tasks he or she is required to perform in a particular situation in the real world; thus, evaluating competence is a complex process,¹⁸ and surprisingly little published literature addresses it in family practitioners. Second, to change attitude and competence, an educational-participative model would be better than a model that uses only printed training materials.¹⁹ Therefore, we conducted a cluster-randomized trial²⁰ to evaluate the effect of such an intervention on the clinical competence of family practitioners managing diabetic patients with nephropathy; we also

determined the effect of the intervention on patients' renal function. We randomly selected 1 primary care unit to receive the intervention (study group), and other unit received no specific training (control group). Twenty-one family practitioners participated in the study group and 19 in the control group. All the family practitioners were administered a questionnaire at baseline and 6 months later; the questionnaire was previously validated in our setting to evaluate clinical competence of doctors who treat diabetic patients with early nephropathy.²¹ The study group received an educational intervention about diabetes and nephropathy, by means of an interactive theory-practice model. The educational strategy was led by 2 of the investigators (LCS, HRMR) and included a theory course, analytical literature review and discussion of real clinical cases for 5 hours/week for 6 months. The control group did not receive any intervention beyond what was offered in its medical unit (weekly general sessions).

To determine the effect of possible changes on the clinical competence of family practitioners, we evaluated the renal function of diabetic patients with nephropathy: 46 patients treated by doctors of the study group and 48 treated by doctors of the control group were followed for 1 year, and clinical and biochemical evaluations were performed every 6 months. At baseline, clinical competence of all practitioners was low and did not differ between the 2 groups. Clinical competence increased in those doctors who received the intervention but did not change in the controls. No practitioner reached a high level of competence, but some physicians in the intervention group attained a moderate level of competence.

Increases in the clinical competence of practitioners seemed to be reflected in their patients' health status; patients treated by practitioners who received the intervention had better control of blood pressure and body mass index and

had better renal function. Of note, practitioners who received the intervention used significantly more angiotensin-converting enzyme inhibitors, angiotensin-receptor blockers, and statins than did practitioners who did not receive the intervention. In addition, physicians in the study group continued using aspirin at cardioprotective doses and eliminated other nonsteroidal anti-inflammatory drugs, contrary to what was observed in physicians in the control group.

Findings in patients treated by the intervention group were similar to those found in patients treated by nephrologists.¹⁶ Thus, a well-trained family practitioner can implement nephroprotective therapies and preserve renal function in diabetic patients, at least at early stages of renal disease. These findings support the notion that primary care physicians can play a key role in managing patients with early kidney disease and help control the epidemic of ESRD. Other strategies that could help increase clinical competence of primary care physicians may be to include kidney disease diagnosis and management topics during the undergraduate medical curricula.

POSSIBLE ROLE OF SELF-HELP AND SUPPORT GROUPS IN MODIFYING LIFESTYLE VARIABLES

A recurrent finding in our previous studies is that neither the nephrologist nor the primary health care physician seems to adequately control variables such as lifestyle and dietary habits, smoking, overweight/obesity, or glucose and lipid profiles, which negatively affect renal function. This is not surprising, as unhealthy habits are common in Western societies. In the United States, for example, only 3% of citizens adhere to 4 key healthy lifestyle characteristics: not smoking, maintaining healthy weight, eating adequate

amounts of fruits and vegetables, and exercising regularly.²² Bad habits are real challenges in developing countries as well, and they are strongly related to the striking increase in noncommunicable diseases, such as diabetes, hypertension, and obesity, observed in recent years in Mexico.²³ Therefore, health promotion has to be incorporated into everything physicians do, and primary care physicians have multiple opportunities to help people because they see them over a longer course of time.²⁴ Notwithstanding, counseling by physicians is not always effective in reducing risky habits, particularly when the health team is overworked. In these cases, other strategies, such as community resources (including support groups), may help patients to break bad habits.

We have applied a new approach in an attempt to improve the lifestyle and dietary patterns of our patients. As a pilot plan in the IMSS system, a program called SOHDI (acronym in Spanish of overweight, obesity, hypertension and diabetes) has been initiated in several units of our country, including the Family Medicine Unit No. 34 of Guadalajara. This program is based on a multiple intervention strategy of self-help with the aid of support groups to modify the lifestyle and dietary habits of patients who are overweight or obese or who have hypertension or diabetes and who have failed to meet clinical practice recommendations. Patients are identified by their family practitioner and then formed into small groups of 20 people. They are then subjected to a multiple educative intervention during a period of 4 weeks, receiving 1 of the following educative sessions every week: 1) emotional management, imparted by a social worker; 2) nutritional patterns, supervised by a dietitian; 3) exercise, by a physical trainer; and 4) health-related problems, by a family practitioner. During the initial period, patients elect 1 leader from their group who will coordinate, motivate, detect needs, and promote free activities for the group

during the next 12 months. Activities during this time may be within and outside the medical unit, and patients freely select social, exercise, or health-related sessions, which are supported by the professional team, particularly the family practitioner. During this time, patients make regular visits with their family practitioner, and for the purpose of research, they are examined every 3 months by means of lifestyle questionnaires and clinical and biochemical examinations. At the present time, 151 patients have been included, 3% of them have been sent because of overweight, 18% because of obesity, 17% because of hypertension, and 62% because of diabetes.

In this SOHDI program, renal function was not originally considered; however, as all of these diseases may negatively affect renal function, we have adapted this program to evaluate renal status. Only a third of the initial patients have had follow-up evaluations at the present time. Because of the small number of patients evaluated at 6 months ($N = 50$), they are analyzed as a pool (not by specific disease). Despite some expected differences related to the main pathology (ie, higher blood pressure in hypertensive patients, higher glucose and triglycerides in diabetics, and higher body mass index and waist circumference in overweight and obese patients), and the preliminary nature of these results, some aspects of lifestyle seemed to be positively affected as a result of this strategy. After 6 months, the proportion of patients eating daily vegetables (baseline 19% vs 6-month 34%, $P < .0001$) and fruit (baseline 42% vs 6-month 71%, $P < .0001$) increased significantly. The proportion of patients adding sugar daily to their meals decreased (baseline 25% vs 6-month 5%, $P = .001$), although those adding salt to meals did not appear to change (baseline 60% vs 6 month 75%, nonsignificant). In addition, the proportion of patients watching television during their free time significantly

decreased (baseline 35% vs 6-month 2%, $P < .0001$), and those doing exercise increased (baseline 6% vs 6-month 22%, $P < .0001$). No differences have been noted in the proportion of patients smoking cigarettes or drinking alcohol, but the proportion of subjects that seem to have a clear goal to control their disease tended to increase (baseline 49% vs 6-month 76%, $P = .07$), as well as those following the medical prescriptions (baseline 80% vs 6-month 90%, $P = .08$). These changes seemed to be in concordance with a trend to decrease systolic blood pressure (baseline 127 ± 14 vs 6-month 123 ± 12 mmHg, $P = .07$), and with significant ($P < .05$) decrease of body mass index (baseline 33 ± 5 vs 6-month 31 ± 5 kg/m²), waist circumference (baseline 100 ± 10 vs 6-month 96 ± 13 cm), serum glucose (baseline 160 ± 72 vs 6-month 139 ± 47 mg/dL), triglycerides [baseline 159 (116–223) vs 6-month 151 (115–185 mg/dL)], and creatinine (baseline 0.89 ± 0.18 vs 6-month 0.81 ± 0.17 mg/dL), as well as with a statistically significant ($P < .05$) increase of high-density lipoprotein cholesterol [baseline 40 (34–49) vs 6-month 42 (34–55) mg/dL], and GFR [baseline 105 (84–132) vs 6-month 106 (77–118) mg/dL]. On the other hand, median values of albuminuria increased, although they remained within normal values, [baseline 0 (0–10) vs 6-month 7.6 (5–12) mg/day, $P = .04$], a change of no clinical significance.

All these findings support the necessity to implement health promotion programs with participation of multidisciplinary teams including dietitians, nurses, and social workers. Although our previous findings with the employment of self-help and support groups of patients may suggest positive outcomes in the patients' health status, they are preliminary and need to be confirmed in further studies with larger sample sizes and longer follow-up. A constant interaction between primary care physicians and specialists (nephrologists,

cardiologists, endocrinologists) is also required. As clinical competence may decrease with the passage of time, a cyclic training or up-to-date advice for primary health-care physicians may also need to be implemented.

In conclusion, primary care physicians with adequate training increase their clinical competence in the diagnosis and treatment of diabetic nephropathy, which is in turn associated with a better preservation of renal function in diabetic patients. This is more evident in the case of early nephropathy than with overt nephropathy. Nonetheless, negative factors related with lifestyle and dietary patterns do not appear to be adequately controlled. Therefore, to improve renal health, it is necessary to implement health promotion programs with primary health doctors leading multidisciplinary teams including dietitians, nurses, social workers, and probably, self-help and support groups of patients. A constant interaction between primary care physicians and specialists (including the nephrologist) is also required, and continuing education for all involved.

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