Primary care models in the management of chronic kidney disease in diabetic patients

Modelos de atención primaria en el manejo de la enfermedad renal crónica en pacientes diabéticos

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Abstract

Introduction: Many patients with CKD are not diagnosed on time in the primary health care setting.
Objective: to compare two models of care on lifestyle and renal function in patients with type 2 diabetes mellitus and stage 1-2 CKD.
Methods: A prospective cohort study included patients with DM2 from two large primary care practices.
Results: MAC MFs increased their final proficiency significantly (P<0.05) to the fair at 74%, low at 21% and very low at 5%.
Conclusions: An MIM achieves better control of lifestyle-related variables in DM2 patients with stage 1 and 2 CKD.

Keywords: chronic kidney disease, type 2 diabetes mellitus, primary care, general practice source: DeCS
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Resumen
Introducción: Muchos pacientes con ERC no son diagnosticados oportunamente en el ámbito de la atención primaria de salud.
Objetivo: comparar dos modelos de atención sobre el estilo de vida y la función renal en pacientes con diabetes mellitus tipo 2 y ERC estadio 1-2
Método: Se realizó un estudio de cohorte prospectivo, donde se incluyeron pacientes con DM2 de dos grandes prácticas de atención primaria
Resultados: Los MF del MAC aumentaron su competencia final significativamente (P<0.05) a regular en 74%, bajo en 21% y muy bajo en 5%.

Conclusiones: Un MIM consigue un mejor control de las variables relacionadas con el estilo de vida en pacientes DM2 con estadios 1 y 2 de ERC.
Palabras Clave:enfermedad renal crónica, diabetes mellitus tipo 2, atención primaria, medicina general fuente: DeCS

Introduction

Chronic kidney disease (CKD) is a global epidemic and represents one of the most important challenges for health systems, particularly in developing countries. CKD is associated with premature cardiovascular disease and mortality[1]. Unfortunately, many patients with early-stage CKD are not diagnosed on time in the primary health care setting. In addition, primary care physicians often do not have the sufficient clinical expertise to manage nephropathy. Subsequently, only a small proportion of patients receive adequate treatment and reach clinical practice recommendations for CKD[2].

It was previously shown that instructing MFs on the topic of educational interventions increased their clinical competence and was associated with the preservation of renal function in patients with type 2 diabetes mellitus (DM2) and early CKD (stages 1 and 2)[3]. However, lifestyle-related risk factors, such as smoking, overweight-obesity, hyperglycemia and hyperlipidemia, have not been significantly modified by either the nephrologist or the family physician (FM) receiving these interventions[4]. Multiple educational strategies aimed at patients at high risk of developing CKD, guided by multidisciplinary teams (social worker, dietician, physical trainer and FM) and supported by self-care groups, significantly improved their lifestyle and eating habits[5].

Therefore, this study was designed to test the hypothesis that, in addition to adequate training for MFs, a multipronged patient-directed educational approach guided by a multidisciplinary health care team would achieve better results on lifestyle habits and renal function in patients with DM2 and early CKD than a conventional approach in which the primary care physician plays the main role in the management of patients and decides when to refer them to other health care professionals.

Method

A prospective cohort study was conducted, where patients with DM2 from two large primary care practices in Ambato were included. One practice was assigned to evaluate a multiple intervention model (MIM) as it had implemented the model for several years. Another practice was randomly selected as a control cohort from 20 units using a conventional model of care (MAC). Patients with no prior diagnosis of CKD were identified in a screening program; those with early CKD were invited to participate and included after written informed consent. Early CKD was defined as the presence of microalbuminuria with normal or slightly decreased GFR (⩾60 ml/min per 1.73 m^2). Glomerular filtration rate (GFR) was calculated using the equation of the four-variable Modification of Diet in Renal Disease Study. At screening, microalbuminuria was assessed with test strips on a urine sample from the first voiding. This study was approved by the Universidad Regional Autónoma de Los Andes (UNIANDES).

None of the MIM patients had prior exposure to this model. After agreeing to participate, all received an educational intervention (2 h/week for 4 weeks) consisting of information sessions guided by a multidisciplinary team: emotional management skills (by a social worker), nutritional advice (by a dietitian), exercise (by a physical trainer), and health problems (by an FM). Appointments were made every three months to evaluate the status of individuals and groups, conduct group dynamics, establish goals for the next meeting, and identify patients who required individual support. On the other hand, patients in MAC were managed solely by the MF, who provided assessments and treatments to patients as they saw fit and decided if a subject needed to be referred to other health professionals. All patients completed a lifestyle questionnaire at baseline and the end of follow-up (6 months) and underwent clinical and biochemical evaluations every 3 months.

The educational strategy included theory and discussion of real clinical cases each week for 40 h within the first three months of the study. After completion of the educational intervention, no additional training was performed. To measure clinical competence, a previously validated questionnaire on diabetic nephropathy was completed by all physicians at baseline and after completion of the course.

Data are expressed as mean ± standard deviation (SD) or median (25th-75th percentiles) when the dimensional variables had parametric or nonparametric distribution, respectively, or as percentage in the case of nominal variables. Between-group comparisons were performed using independent Student's t-tests, Mann-Whitney U or χ^2, as appropriate. Intragroup analysis was performed using Student's t, Wilcoxon or McNemar tests for paired samples. A p-value < 0.05 was accepted as significant, but the exact value is shown preferentially. The database and statistical processing of the data were performed and analyzed in the SPSS 26 statistical program (SPSS Inc., Chicago, IL, USA).

Results

Ninety-six of 300 patients evaluated had confirmed early CKD: 45 in MIM and 51 in MAC. Thirty-nine patients completed six months of follow-up in each cohort (results will be shown for the latter patients).

Baseline sociodemographic characteristics were similar between cohorts (Table 1). The results of the lifestyle questionnaire; at baseline, there were no significant differences between cohorts; however, the results reflected an unhealthy lifestyle. After six months, the total score and eating habits improved in both cohorts; however, these and other variables assessed by the instrument (knowledge of the disease, adherence to treatment, emotional management, exercise, and tobacco and alcohol consumption) showed greater improvement in MIM than in MAC.

Table 1. Comparison of lifestyle patterns between patients in both cohorts.

	MIM (N =39)		MAC (N =39)		
Variable	Basal	Final	Basal	Final	Possible highest score
Knowledge of the disease	2,8±2,9	5,4±2,7	3,6±2,4	4,5±2,5	
Adherence to treatment	11,3±4,5	13,8±3,0	12,2±3,7	12,5±3,4	
Emotion management	7,3±3,5	9,8±3,2	5,7±3,3	6,3±3,7	
Exercise	6,0±4,0	7,3±3,4	5,9±4,0	5,8±3,5	
Tobacco use	7,6±1,4	8,0±0	6,9±2,4	7,2±1,7	
Alcohol consumption	6,6±2,3	7,6±1,2	6,2±2,7	6,7±2,1	
Diet	25,5±5,7	29,7±3,7	24,6±5,1	27,9±3,9	
Total	66,5±12,5	79,5±10,0	65,5±11,5	71,7±10,8	

Source: statistical analysis, p≤ 0.05, Abbreviations: MAC, conventional health care model; MIM, multiple intervention model.

Concomitant with lifestyle changes, blood pressure decreased in patients in both cohorts. In addition, body mass index, waist circumference, and HbA1C decreased significantly in MIM patients, but they remained unchanged in MAC.

After a 6-month follow-up, GFR remained at similar levels in patients in both cohorts; however, despite having tended to be

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higher at baseline, albuminuria decreased significantly only in MIM, whereas it remained unchanged in MAC.

Thirty-seven MF participated, 16 in MIM and 21 in MAC. All completed the educational intervention and no differences were found in age (47±5 vs. 44±7 years, respectively), gender (women 75% vs. 68%, respectively) and years of work experience (17 years). ±6 vs. 17±7, respectively). At baseline, MIM MFs had fair anticipated clinical competence in 38%, low in 56%, and very low in 6%; after the course, these findings improved significantly (P<0.05) to fair in 44%, low in 50%, and very low in 6%. MAC MFs had baseline clinical competence of fair level in 37%, low in 53%, and very low in 10%. Their final competence increased significantly (P<0.05) to fair in 74%, low in 21%, and very low in 5%. No significant differences were observed between the MFs of both cohorts, either at the beginning or the end of the educational intervention.

When comparing the initial versus final evaluations, patients in both cohorts significantly (P<0.05) increased the number of antihypertensive drugs used (MIM 0.84±0.72 vs. 0.95±0.77; MAC 1.0±0.65 vs. 1.31±0.73) and had a significant tendency to increase the use of angiotensin-converting enzyme inhibitors (MIM 47 % vs. 53 % MAC 56 % vs. 61 %) and angiotensin receptor blockers (MIM 5 % vs. 13 % MAC 10 % vs. 20 %). The final number of antihypertensives was significantly (P <0.05) higher in MAC than in MIM. Both cohorts significantly (P<0.05) increased aspirin use (MIM 38 % vs. 89 % MAC 46 % vs. 66 %) and reduced use of other nonsteroidal anti-inflammatory drugs (MIM 56 % vs. 23 % , P<0.05; MAC 61 % vs. 31 %, *P* not significant) at the end of the study. There was an increase in the number of lipid-lowering drugs used (including statins and fibrates) in both cohorts (MIM 0.42 ± 0.76 vs. 0.84 ± 0.88; MAC 0.34 ± 0.66 vs. 0.55 ± 0.79), but this was statistically significant (P<0.05) only for patients on MIM. Antidiabetic drugs (including insulin and oral hypoglycemic agents) showed only a nonsignificant increasing trend in both cohorts (MIM 1.61 ± 0.55 vs. 1.71 ± 0.65; MAC 1.82 ± 0.68 vs. 1.92 ± 0.66).

Discussion

Given the magnitude, implications, and cost of ESRD for both patients and health systems, strategies to counteract this problem in the early stages are important and welcome. The application of several nephroprotective strategies and their positive impact on renal function in the early stages of CKD have been demonstrated when FMs received appropriate training in the primary health care setting[6,7]. However, the challenge is to modify lifestyle and negative dietary patterns in at-risk populations (as in the present study), as these could, directly or indirectly (through comorbid events associated with CKD), eventually affect renal function[8]. The importance of modifying an unhealthy lifestyle is evident,[9] and the use of multidisciplinary approaches for this purpose is well recognized in the primary health care setting[10].

In recent years, there has been growing interest in using multidisciplinary strategies to delay the progression of CKD. The results, however, have been mixed. Some studies have failed to demonstrate an improvement in renal function, mortality or risk factor control with multidisciplinary teams in patients with stages 3-5 CKD[11,12].In contrast, others have demonstrated improved survival or a slower decline in GFR than patients receiving usual care. However, in the case of the latter study, this effect was not associated with a significant improvement in blood pressure, HbA1C or LDL cholesterol that could explain the better preservation of renal function[13,14]. The results showed that a MIM based on an educational program for patients, guided by a multidisciplinary health team and supported by self-help groups, is superior to MAC in improving lifestyle habits, preserving renal function and reducing albuminuria in patients with DM2 and early stage CKD. There are several differences between previous studies and ours.

First, all previous studies[15,16]focused on patients with CKD stages 3-5 (intermediate and late CKD), whereas the present study was limited to patients with CKD stages 1 and 2 (early nephropathy), which are the stages in which nephroprotective maneuvers are most likely to be effective[17,18]. Second, the authors measured both actions taken by patients to improve lifestyle habits and clinical-biochemical variables of renal function. They demonstrated concurrent changes in both measures and appropriate changes in medical treatment, strongly suggesting a causal relationship between the multidisciplinary approach, educational intervention and these outcomes. Third, adequate information for managing CKD was available online to all health professionals who participated in the study; furthermore, all physicians participated in the educational intervention and a significant increase in their clinical knowledge was demonstrated. Finally, MFs in MAC tended to have a greater increase in clinical competence than MFs in MIM, which may further emphasize the positive impact of the comprehensive nature of MIM on patients through educational intervention, self-help groups, and dynamic follow-up; all of these strategies guided and supported by a multidisciplinary team[19,20]. Limitations of the study are the relatively small number of patients included and the short follow-up period; completion of current and future studies would help to support the results. In addition, further multicenter studies are needed to assess the external validity of the results and to consider their applicability to other national or international settings.

Conclusions

An MIM achieves better control of lifestyle-related variables in DM2 patients with stage 1 and 2 CKD, which physicians acting in a MAC do not modify. It is also important to adequately train primary health care professionals in managing early CKD. Overall, implementing a MIM in a primary health care setting may have better outcomes than MAC in preventing or delaying the progression of CKD.

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