

The role of an out-patient renal clinic in renal disease management

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ABSTRACT

The out-patient renal clinic (ORC) represents an important part of the nephrology service in general hospitals. The majority of renal diseases are chronic and patients need a systematic follow-up according to the severity and progression of kidney failure. The most important clinical manifestation is chronic renal failure (CRF) or chronic renal disease (CKD) The management of CKD, apart from medical and nursing services, also involves a number of community structures and financial resources. CRF treatment is costly and is a serious problem for the health systems in the western world. Effective treatment in the early stages aims to decrease the progression of kidney damage and, therefore, to prolong kidney function. Patients with renal failure can be managed as out-patients. The increased number of patients and the complexity of kidney diseases demand the collaboration of other out-patient clinics. The ORC may play an important role in this process. In this article. we present a literature review of the role of ORCs in the management of renal diseases around the world and we also present data based on our experience in our ORC.

Key words: ESRD, out-patient clinic, renal diseases, renal failure

INTRODUCTION

A clinic (either an out-patient clinic or an ambulatory care clinic) is a health care facility that is primarily devoted to the care of patients. Clinics can be privately operated or publicly managed and funded, and typically cover the primary health care needs of populations in local communities. The word derives from the Greek *klinein* meaning to slope, lean or recline.^[1] The out-patient renal clinic (ORC) represents an important part of the nephrology service of the general hospitals. Using a quote from the Johns Hopkins Hospital's web page, "... treatment of patients with severely compromised renal function, though not yet dialysis-dependent, can be coordinated and managed through the Out-patient Nephrology Clinic, using available consultations with experts in nutrition, metabolic bone disease, urology and vascular/renal transplantation. Consultation for congenital renal disorders and genetic counselling is also available on an outpatient basis." Therefore, the significant increase in the needs

of specialized care with the increased number of nephrology patients and the therapeutic cost could be covered through the out-patient nephrology service.^[2,3]

Maim causes and prevalence of renal diseases

Renal diseases are a number of diseases that involve not only the kidney but also the systematic pathological process. The kidney has been proven to be the target organ for many diseases, but it has also been proven that it participates in a number of complex pathophysiological processes mainly affecting the body's homeostasis.^[4] The implication of the kidney in homeostatic mechanisms affecting the whole body and overall health accentuate the importance for early diagnosis and appropriate management, reducing the rate of disease progression from early stages to end-stage disease.

Chronic kidney disease (CKD) staging is a useful guide, but it has not been proven to be evidence-based. However, CKD care must be individualized. Clearly, despite

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decades of research, the processes and mechanisms of translation from CKD to end-stage renal disease (ESRD) and the need for renal replacement therapy (RRT) have not been fully understood.^[5]

At stage five, renal failure renal replacement is needed. RRTs that are available today are hemodialysis, peritoneal dialysis and kidney transplant, and all are very high cost therapies as mentioned above. Currently, with the economic crisis, it is very important to prolong the stages before ESRD is reached to ensure a longer, better quality of life for the patients and to minimize costs for the national health insurance systems. The role of ORCs is very important in achieving this target as preventive medicine is fundamental in treating CKD patients.

The prevalence of CKD is currently more than 10% in the general population and reaches 14% according to some studies and more than 50% in high-risk subpopulations.^[6] However, the prevalence of CKD in the early stages as well as treated end-stage disease (ESRD) differs from country to country. In developed countries, the prevalence of patients receiving treatment is the highest (more than 80%) basically due to a vast elderly population and facilitated access to health care. On the other hand, in poor countries, the prevalence of patients receiving treatment for ESRD is low mainly because of refusal for treatment due to lack of facilities; whereas in developing countries, i.e. China and India, where economies are rising and facilities offering RRTs are being developed, the number of patients being accepted for therapy is rising. This improvement in health care services may be outweighed in the future, as in developing countries the elderly population is expanding quickly.^[7]

More specifically in the United states, the prevalence of ESRD is estimated to be 8-15% and the number of patients enrolled in the ESRD Medicare-funded program has increased from approximately 10,000 beneficiaries in 1973 to 615,899 in December 2011.^[8,9] In Greece, according to the national database and registration authority for CKD patients, currently 43.903 patients are diagnosed with CKD, of whom 12.675 are receiving treatment with dialysis, either hemodialysis or peritoneal dialysis.^[10]

Worldwide, diabetes mellitus is the most common cause of CKD, raising the number of patients suffering from early kidney disease dramatically as the kidney is one of diabetes target organs. The prevalence and management of diabetic nephropathy in a diabetes clinic were detected in 644 patients attending a diabetes clinic over a 6-month period by Craig *et al.* Microalbuminuria was available for

485 patients (75%). A total of 115 patients were identified as nephropaths (prevalence 17.8%).^[11]

Similarly, arterial hypertension is also a leading cause of CKD. Of 414 consecutive hypertensive out-patients referred to a nephrology clinic, only 26.6% of patients had adequately controlled blood pressure. Eighty-five percent of patients aged >65 years had uncontrolled systolic hypertension. Elderly patients, diabetic patients and nephropathic patients seem to be the more difficult to treat.^[12]

Data collected from 1632 patients with hypertension by ORCs show that a higher normalization rate was achieved in essential hypertensive patients compared with patients with hypertension secondary to chronic renal insufficiency and diabetes. The percentage of the total patients with normalization of blood pressure by the nephrologist in the last visit were higher in relation with the first visit (38% versus 2%).^[13]

In some regions, other causes, such as herbal and environmental toxins, are more common.^[6] However, it seems that the risk of kidney disease, apart from being acquired, has a genetic predisposition as identified genes have provided information for relevant abnormalities in renal structure and function as polycystic kidney and important homeostatic processes. Polycystic kidney disease (PKD) is another well-known cause of CKD, one of the most common life-threatening genetic diseases affecting an estimated 12.5 million people worldwide.^[14] Studies show that 10% of ESRD patients being treated with hemodialysis in Europe and the US were initially diagnosed and treated for autosomal dominant polycystic kidney disease (ADPKD).^[15] ADPKD does not appear to demonstrate a preference for any particular ethnicity. The majority of people afflicted with PKD have a family history. The children of a patient diagnosed with PKD should routinely be screened and monitored by a nephrologist in order to prevent complications.

PKD varies greatly in its severity, and some complications are preventable. Lifestyle changes and medical treatments may help reduce kidney damage. In Robinson *et al.*'s study in an ORC clinic with 142 polycystic disease patients, they reported that genetic factors influence the progression of renal failure in patients with polycystic CKD. PKD2 testing has a clinically significant detection rate in the pre-ESRD population. It did identify a group less likely to progress to ESRD. When used with detailed provision of a family history, it offers useful prognostic information for individuals and their families.^[16] Evidently, different pathological processes may lead to kidney injury and consequently renal failure either acute or chronic.

Management and ORC

Management of renal diseases should be performed in a holistic approach as resilience is described as a multifactorial process. A number of factors, individual or familiar, may play an important role in the progression of renal diseases. According to Ma *et al.*'s study in an ORC, factors affecting pre-ESRD resilience were gender, occupational status, diabetes and health-promoting behaviors. Factors affecting resilience of the high-risk group included level of education and health-promoting behaviors, while factors affecting resilience in the early CKD group involved whether they are employed and health-promoting behaviors. The authors conclude that nursing education should focus on health promotion advocacy throughout the life of not only patients but also their families.^[17] Moreover, according to Turin *et al.*, management should be based on individualized, long-term risk estimates that are increasingly used in clinical practice, treatment guidelines, screening and education campaigns, health care utilization planning and goal development for risk reduction and preventative behavior.^[18]

Screening for early stages of CKD and intervention can prevent CKD, and, where management strategies have been implemented, the progression of the disease as well as the outcomes have been limited. It has been established that patients suffering from early stages of CKD have a five-to 10-times higher risk of dying from a cardiovascular event than progression to ESRD and that most patients die of a cardiovascular event before they even reach ESRD.^[19] Along those lines, it would be insightful to review which patients actually visit a nephrology outpatient clinic in order to assess awareness of the disease and patient follow-up services. According to Harel *et al.*'s study, patients referred to an ORC are either patients who had no hospitalization prior to their first visit or patients who have been hospitalized and had been diagnosed with acute kidney injury. Acute kidney injury or acute renal failure is a common complication of hospitalized patients. Those patients have a 40% risk of dying in the 2 years after the initial hospitalization. Furthermore, they found that the risk of death increases with the severity of the injury, with patients who require dialysis, having the highest risk of death. This risk persists even after the patients recover from their acute kidney injury and no longer require dialysis. However, only 8% of patients hospitalized with acute kidney injury requiring dialysis visit a nephrologist a year after discharge. It has been found that patients who had a follow-up visit with a nephrologist were more likely to have preexisting CKD, hypertension, previous visits to a nephrologist and a kidney biopsy before hospitalization. Also, patients who received early nephrology follow-up were also more likely to require chronic dialysis than those without follow-up.^[20] Moreover, the mortality rate for

patients with early follow-up has been estimated to be 8.4 per 100 patient years compared with 10.6 for those with no follow-up data, highlighting the importance of early referral of hospitalized patients directly after discharge to an out-patient nephrology clinic and implementation of a close outpatient follow-up by a specialist nephrologist.

Introduction of estimated glomerular filtration rate reporting and CKD Quality Outcomes Framework (QOF) domains was associated with a rapid (61%) increase in new patient referral and an increase in the mean age of the patients at referral from 63.0 +/- 18.1 to 69.1 +/- 18.5 in the UK. This new management pathway has helped to manage the increased demand within the current resources.^[21] In hospitals with an out-patient nephrology clinic, there was a lower proportion of patients with unreferred renal impairment than in hospitals without an out-patient nephrology clinic according to Craig *et al.*'s study. Within the unreferred patient group, there were significantly more patients whose renal function improved during the follow-up period. A considerable proportion of patients with documented deterioration in renal function remained unknown to nephrology services 6 months after initial presentation. Other than the presence of an onsite nephrology service, the only other factor found to be significantly different in those patients not referred to nephrologists was age. Inequity of access to renal services is an important obstacle to early referral of patients with impaired renal function.^[22]

After reviewing the general set up of many ORCs in Europe and Northern America, as they are described on their home web pages, it is evident that they differ according to many different factors. There does not seem to be an ideal set up for an ORC. The services provided by an ORC depend on the size of the hospital, the functioning of a kidney transplant unit, the overall number of patients and the number of personnel; more specifically, the number of nephrologists and interns as well as nursing staff. The ORC are also developed according to the nephrologists' special interests; for instance, hypertension, diabetic nephropathy, glomerulonephritis, which can be separately functioning ORCs as well as separate ORCs for patient follow-up for kidney transplant and peritoneal dialysis. As a result, the experience of nephrologists working in an ORC may differ according to the general setting as well as their own special area of interest.

All ORCs manage patients with hypertensive and diabetic nephropathy as diabetes mellitus and arterial hypertension are the leading causes of kidney disease today. Diabetes mellitus is usually managed by diabetes specialists or general practitioners (GPs) and arterial hypertension is managed either by cardiologists or GPs. Cross-specialist

collaboration with nephrologists is important for the detection of early kidney disease as well as prevention of disease progression, as it has been shown that adequate control of diabetes and hypertension are the key for the “regression of kidney disease.” The Bruno *et al.* study reported that in their out-patient clinic activity, the collaboration with the GPs and nephrologists may improve the definition of the diagnostic-therapeutic course for the benefit of the patient. In the program which they are carrying out, they have established consulting hours during which GPs can call nephrologists at the hospital to discuss the best diagnostic-therapeutic approach for individual kidney patients and they have identified diseases of common interest (isolated urinary abnormalities, hypertension, nephrotoxicity, abnormal renal function, chronic renal failure, urinary infections, kidney stones). Also, they planned to draw up clinical guidelines to be sent to the GPs and pediatricians of their area.^[23] An interesting recent study by Chen *et al.*, with a total of 1382 CKD patients, stage 3B-5, aged 18-80 years in an ORC present the advantages of an multidisciplinary care program in relation with a nonmultidisciplinary care patients using age, gender, CKD stage and diabetes mellitus as variables. They found that the multidisciplinary care group showed a slower estimated glomerular filtration rate decline ($P = 0.021$) and a lower increase in phosphate ($P = 0.013$). Cardiovascular and infection events were both decreased in the multidisciplinary care group ($P < 0.001$). There was also less requirement of emergent start dialysis (39.6% vs. 54.5%, $P = 0.001$). The annual cost for the multidisciplinary care group was lower than the nonmultidisciplinary care group (US \$ 2372 vs. 3794, $P < 0.001$). In addition, considering the reduction of patients requiring RRT, the multidisciplinary care program saved a total of US \$ 1931 per patient annually. By decreasing hospitalizations, emergent start and the need of RRT, the multidisciplinary care program was cost-effective.^[24] In the remarkable study with a pediatric out-patient nephrology clinic by Davis *et al.*, it was found that facilitation of adaptive and physical functioning requires multidimensional training and/or counseling interventions with the children and their families.^[25] But, migrant families seem to be less satisfied with the provision of the out-patient care provided than nonmigrants.^[26] Patient education for CKD patients on RRTs seems to define their compliance to therapy, but more research is needed. It is reported that a CKD clinic staffed by advanced practitioners (physician assistants, nurse practitioners and/or clinical nurse specialists) provides a natural fit for patient education. Educated patients prefer home modalities more frequently; more often, start dialysis with a permanent vascular access and generally score higher on tests measuring mood, mobility and anxiety. However, sufficient research into the effects of CKD patient education is lacking.^[27]

Despite the efforts by the CKD clinic staff, it is not so easy to achieve the best compliance by the patients as shown in the Kutlugün *et al.* study, where 85% of CKD patients under regular nephrologic care were consuming more sodium than the recommended level. A total of 373 consecutive out-patients with CKD stages 1-5 were enrolled in the study and the mean 24-h urinary sodium levels of two consecutive urine samples were 168.8 ± 70.3 and 169.3 ± 67.4 mEq/day ($P > 0.05$). Only 14.7% of the patients had a sodium excretion < 100 mmol/day. The authors conclude that more robust measures should be devised to increase patient and physician compliance with reducing sodium intake in CKD.^[28]

Personal experience

Our ORC is set in the same building as the renal dialysis unit, unfortunately without the essential facilities and staff. It is run by a nephrology specialist and an intern. Despite this, our nephrology out-patient clinic has more than 1800 patient visits per year. It has been functioning approximately for 4 years and currently more than 700 CKD patients are monitored routinely. The clinic also provides services for a limited number of patients on peritoneal dialysis and renal transplant patients. The most common diseases are diabetic nephropathy (19%), glomerulonephritis (16%), hypertensive nephropathy (15%), nephrolithiasis (7%), nephrotic syndrome (7%), chronic renal failure of unknown etiology (4%), cancer and kidney diseases (6%), heart failure (1%), obstructive nephropathy (1%) and others (14%). In this group, a number of different renal diseases were included, such as lower urinary tract infections, electrolyte disorders, metabolic disorders, mononephros. Data from patient referrals during one trimester are shown in Figure 1. The above data derives from a total of 394 patient referrals in our ORC during a 3-month period. None of the patients were hospitalized as their medical problems were effectively managed on an out-patient basis. During

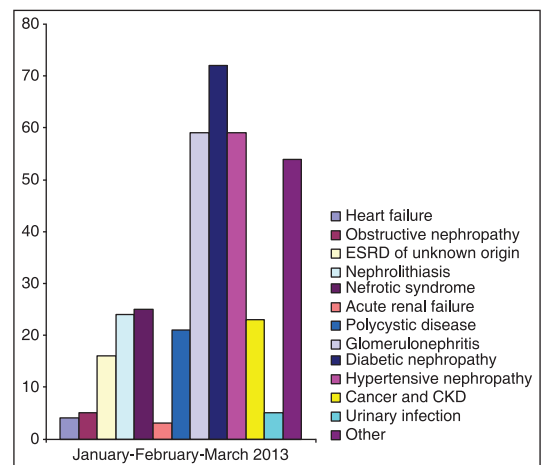


Figure 1: Number of patients per diagnosis in our out-patient renal clinic during a 3-month period

this period, we have also seen transplanted and continuous ambulatory peritoneal dialysis (CAPD) patients. As seen, our data reflect the data from the literature.

CONCLUSIONS

The out-patient nephrology clinic is an important structure and a challenge for the nephrology care of patients with kidney diseases. The increased number of patients and the complexity of the diseases needs the collaboration with other out-patients clinics of the hospitals. Early referral according to the stage protocols may decrease the number of patients requiring replacement therapy, which decreases the quality of life of the patients and also increases the cost of health treatment that is also very important in our time with the universal economical crisis.

The authors have nothing to state about this review.

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